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An Agricultural Ruin

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Transforming Modern Industrial Ruins Into Productive Landscapes

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Advisory Group: A Difficult Whole

We are living in a current geographic and environmental crisis that revolves around a currently unsustainable food industry, a lack of relationship with nature, and a distance between the food we consume and where we get it from, specifically in urban environments. Through the deconstruction and activation of the initial structure, this design is intended to bring specified green and productive spaces back into urban environments and reclaim the pollutive narrative of past industrial sites. As architects, we have a responsibility to enact positive interventions in our urban environments rather than ignoring them. Our urban ruins can be reused and become productive through continuous reinvention. The intention is to alter industrial sites in order to engage and provide for the local urban context.

Ruin

A ruin is defined as a site or the act of collapse, deformation, and deconstruction. Piranesi and other historical artists and architects used ruin and the ruination process to explore and examine the identity of structures and their potential futures. They represented structures in their fragmented and deconstructed state. Through this process, they collapsed and deformed these historical structures and in doing so, re-framed their spatial narrative, programmatic use, and accessibility. They saw the structure life cycle not as something that wasn't linear but rather apart of an evolving landscape.

Piranesi, Giovanni Battista. Yale University, n.d.

Piranesi, Giovanni Battista. Yale University, n.d.

Ruin (v)

To damage irreparably
To reduce to ruin
To collapse

Ruin (n)

The remains of something destroyed
A damaged object
The action of destroying
Physical, moral, economic, or social collapse
Falling down

Thesis Statement

This thesis uses ruin to a radical alteration and preservation of obsolete industrial sites through the process of stripping back, in order to highlight and explore the history and potential of an industrial site's temporal identity. Through alteration, the specific, utilitarian, and abandoned typology will be altered into a new, productive, and sustainable "difficult whole".

Ruin As Imagery

"False ruins, also known as "follies," enjoyed a great vogue in the 18th century"

Artists and painters especially in the 18th century would fantasize and visually establish ruin as a way to explore a building's future potential. It was less of a speculation and more of an idealization. These pieces imagine the ideal collapse of architecture and speculate a future modernity that is both overgrown, desolate, and a bit apocalyptic. The fascination with ruins started to manifest itself into architectural form in an aesthetic way.[1]

Artist like Joseph Gandy purposefully deviated from realism. He wanted to represent not only the exterior deterioration but also the interior. Architects like Robert Adams participated in the Grand Tour that had a focus on analyzing, exploring, and representing in ruin classical architecture. Hubert Roberts who was a French painter, painted ancient ruin remains that were both bright and eerie. They operated in a state of overgrown chaos and the representation of vegetation, selective lighting that penetrated through the roof collapse, and the displayed interaction with people was both ethereal and mystic. He didn't draw an exact representation, rather his drawing speculated how a structure, through ruin, is transformed into a landscape that was approachable and multi-functional. Piranesi drew potential futures as sites of overgrowth who's identity was tied to the represented deterioration. Depicted are sites devoid of human and social conditions that restrict its accessibility.

Ruin as an imagery became a form of alteration. These drawings are inherently representing green spaces. Historically, the imagery of ruin was romanticized and picturesque. There was an understanding that through ruin, a new beauty within the structure would be revealed. That time would strip and deteriorate a structure and that mother nature will have an intervention. These artists combined landscapes with structure. The buildings started to become inflections[2] of the landscapes rather than autonomous bodies. In doing so, these representations started to blur the original boundaries of the building that separated public and private and overall program and accessibility.

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1 Heathcote, Graham. "Exploring Cult of Ruins in U.K." AP NEWS. Associated Press, August 6, 1999. https://apnews.com/243a0761d91b99e3a50a7442d1d6e395.

2 Venturi, Robert. Complexity and Contradiction in Architecture. MOMA:1966. 10. The Obligation Toward the Difficult Whole

Piranesi, Giovanni Battista. Yale University, n.d.

The modern ruin carries on this trend and stresses overgrowth and looks alien within the context of urban production that contextualizes the structure. Ruins have created a following and operate within a specific aesthetic. They are mysterious and there is a perceived opportunity of discovery of something specific within. These sites are places of overgrowth and places of foreign growth. The location looks foreign. The buildings ooze instabiity and unsuability. What are the secretes that these places are hiding? And what is their potential?

The end goal of this project is to speed up the ruin process, termed ruination, of a structure and strip it to its essence. From there, rebuild it to accommodate a new productive program. To enable a dual modernity that represents both the past and provides the framework for a new future. Curating and transforming the historical ideas associated with ruin like feral overgrowth and deterioration/ collapse into beneficial moves that support useful overgrowth in the form of food production and curated horticultural sites.

Design Probelm

The earth matures when dependency and the circle of life is formed and functions. Plants are grown from the sun and have nutrients. Herbivores eat them and then carnivores eat them both. They poop and provide future fertilization and nutrients and when they die, deteriorates return the elements contained in the carcass back into the earth.

Our built environment does not reflect this circle of life and rather our built environment can be described as a linear “life and a death” line. We should push for environmental inflection and have our buildings exist in an ever adaptive life cycle.

This project seeks to utilize and explore the potential of specific industrial ruin typologies within urban environments and transform them into productive landscapes that become a hub/center for agricultural development. It will implement borrowed, historical, and external languages and translate them into the contextual typologies and create a difficult whole through adaptive reuse of a unique site. This project will as a result respond to environmental and geographic crises by implementing a form of self-sustainability and urban contingency. This project will define the typology in a way that is both broad and specific allowing the specified program and reuse to be a transferable model. This project sees adaptive reuse as an opportunity to explore alteration and partial addition.

A difficult whole is described as the creation of potential for a relationship. It speaks to urbanism and architecture as being varied and yet cohesive. The attempted alteration and addition should be an inflection and should be a contingent fragment to the overall whole of the typology and city.

We are in the current crisis of an unsustainable food industry that is not equipped for the impending population increase and increasing urbanization. We have historically not produced a healthy metropolis for us to live in[1]. It is our moral and civic duty to respond to and correct this as humans put the earth in its current state. We have created an unsustainable system of supply and demand on food that has been detrimental to the environment. We have also lost power in our own food choices to Big Business and loose FDA laws.

In mid-sized cities there was less pressure to redevelop the areas occupied by factories even though they had been closed for a relatively long time. [2]
Half of the worlds residents live in small-to-medium-sized cities'[3]
By 2050 it is estimated that 80% of all food will be consumed in urban areas. Construction as an industry is harmful and contribute to 39% of Co2. It also is one of the biggest pollutants and consumes 1/3 of the worlds energy use.[4]
Our current food system is contributing to land degradation and soil degradation. It is also contributing to greenhouse gases. 1/3 of the food grown is lost on farms or in the supply chain or thrown away. [5]

Agricultural Runoff is also heavily effecting the planet. Vertical Farms is a solution that would presumably recycle water and utilize grey water. It also doesn't use pesticides. We as a world also do not have the space for an increase in agricultural production in the conventional way for the rising population[6].

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1 Despommier, Dickson D. The Vertical Farm: Feeding the World in the 21st Century. New York: Picador, 2011.

2 Bergeron, Louis, and Maria Teresa. Maiullari-Pontois. Industry, Architecture, and Engineering. New York, NY: H.N. Abrams, 2000.

3 Martellozzo F et al. Urban agriculture: A global analysis of the space constraint to meet urban vegetable demand. Environmental Research Letters. 2014.

4 Chris. "'We Need Agriculture Back in Our Cities and in Our Minds.'" Dezeen. Dezeen, March 8, 2019.History of the loss of local farms

5 Campari, João, and WWF International. "How Our Food System Is Eating Away at Nature, and Our Future." World Economic Forum. Accessed November 5, 2019. https://www.weforum.org/agenda/2018/11/we-must-rethink-our-food-system-from-planet-to-plate/.

6 Despommier, Dickson D. The Vertical Farm: Feeding the World in the 21st Century. New York: Picador, 2011.

Productive Landscapes.

Urban designers have been trying to organize relationships between design, production, commerce, and consumption to constitute an overall way of life better than the one represented by modern industrial society.

There is a difference between un-engineered landscapes and engineered landscapes in the same way that there are human plant landscapes and non-human plant landscapes. Landscapes require a negotiation between human intervention and leaving the earth to operate by itself.[1] While that notion is commendable and ideal, the need for manufactured productive foodscapes within urban environments starts to chip away at a crisis that is directly affecting the future of the human race.

"Food waste can easily be converted back into energy employing clean state-of-the-art incineration technologies and wastewater can be converted back into drinking water" [2]

Urban cities are seen as productive in manufacturing or the capital production. A productive landscape inherently opposes the urban wasteland. These post-industrial sites within the cities very much are an environmental and programmatic wasteland.
Agriculture is typically located on the outskirts of these urban environments. '
Productivity does not have to be exclusive to the benefit of human individuals, Dickson among other theorists suggest that an agricultural migration to the cities leaves the farms with the ability to be converted into other ecosystems like forests.

1 Nils Bubandt and Anna Tsing "Feral Dynamics of Post-Industrial Ruin: An Introduction, "Jounral of Ethnobiology 38 (1), 1-7 (March 2018). https://doi-org.libezproxy2.syr.edu/10.2993/10.2993/.0278-0771-38.1.001

2 Despommier, Dickson D. The Vertical Farm: Feeding the World in the 21st Century. New York: Picador, 2011.

Productivity operates on multiple scales. This project deals with economic productivity, urban renewal (productive), and environmentally productivity. In the form of edible landscapes or productive food landscapes.

"reconfigure food supply and produce food locally in cities, as well as political theoretical and creative reimagining both of food systems and how cities work".[1]

"Productive capacity of cities can support efforts to provide an adequate supply of sustainable nutritious and safe food to a growing population and in the face of climate change." [2]

Garden city is a model for integrating food into the urban fabric, although its detachment to the industrial city makes this precedent harder to relate. This projet is instead much more linked to Dickson Despommier's Vertical Farm or the Vertical Harvest in Jacksonhole,Wyoming.

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1 Despommier, Dickson D. The Vertical Farm: Feeding the World in the 21st Century. New York: Picador, 2011.
2 Despommier, Dickson D. The Vertical Farm: Feeding the World in the 21st Century. New York: Picador, 2011.

Production

Urban farming and creating food is the main way to tackle environmental crieses and geographic crises like food deserts. Production within this project is located in the interior and these axons look at 3 ways of growing and what these things need. In identifying the need this opens up potential for alteration and for mixing and defining. The need to create separate environment becomes apparent and the launch point for design would be to separate and decide the level of productivity.

Gathering

Foodscapes are also the "places and spaces where you acquire food, talk about food, or generally gather some sort of meaning from food.[1]" Productive is also defined as beneficial for the community or individual wellbeing. Food and growing is a community act and can bring people together. The idea of productivity doesn't necessarily have to be quantifiable or technical. This program looks at places that aren't necessarily places of conventional farming, rather they are places where inidivudals can gather in food or horticultural sites. It also includes the foraging stage. These programs show a place of experimentation and gathering and community in the form of a restaurant bringing the most literal farm-to-table within an urban environment. The foraging garden place is a controlled environment that grows moss, fungi, and non-native plants. The environment is for gathering, comfort, solace, and discovery. This plantscape seeks to define productivity by empowering the individual to find something within this place for their own. This calls to mind the old imagery of ruin and really seeks to capitalize on the overgrowth aesthetic of ruin and alter it into a controlled homage to the wild and mysterious aesthetic that comes with the typology.

1 MacKendrick, Norah. "Foodscape." Contexts 13, no. 3 (August 2014): 16–18. doi:10.1177/1536504214545754.

Distributing

Network. The fact that these industrial structures are built in common design moves, this allows for a network of adaptable like projects to speculatively exist. The goal of this project is to expand upon the idea that this intervention can be transferable to multiple industrial sites. This particular is not regulated to one exact location within a city. Rather it is dispersed throughout an urban environment, usually around a water source. As a result, this project seeks to suggest and outline a network of industrial sites that are all working to produce and gather and bring agri-tecture into the inner-city. The "distribution" aspect of the project is about setting up a blueprint and catalyst for future productive landscapes with the specific site building as the host or hub. Foodscapes are not just regulated to one site rather they are a network of multiple sites and places.[1]

1 MacKendrick, Norah. "Foodscape." Contexts 13, no. 3 (August 2014): 16–18. doi:10.1177/1536504214545754.

Foodscape

A “scape” is the representation or construction of an element or a conditon. A foodscape is a construction of food and the growing, gathering, and distribution process. A productive food landscape integrates food growing into the urban fabric in the same way that Ebenzeer Howard’s Garden City would have. A foodscape would supply and produce food within urban environments and would rethink the relationship between food systems and cities.

Urban Farming can reshape where we live and the way we eat. It brings back farming as a core for gathering. This project seeks to create a self-contained foodscape that introduces a new program and interweaves it into the fabric of the landscape. Vertical Farming is a type of Urban Farming that doesnt require soil and uses less water. This system also has a higher yield in production. For example, a hydroponic farm can increase the number of plants by 4-16x per acre. For every acre of lettuce the yield would be 21000lbs in the hydroponic system vs 9000lbs in regular soil.[1]

Hydroponic (Indoor Farming)
A system where plants are grown in nutrient water that has been enriched with minerals. Soil free relies on the roots that are sitting in water to acquire the water.

Aquaponics (Indoor Farming)
Joint plant and fish in the same ecosystem. Fish are grown in ponds producing nutrient rich waste that is used as food source for the plants in the farm, the plants in turn filter and clean the wastewater which is recycled to the fish ponds. Sometime worms are used to break down fish diseases in the growing medium

The intended working model is a co-op system that is utilitarian, member owned, money goes to operating costs. There is a private and public access differentiation. Interactive part with city is a market, restaurant and growing/foraging garden but the production and experimental centers are operated by trained citizens and a select group of people.

1 “Hydroponics Yield [Do Plants Grow Better in Hydroponics or Soil?].” uPONICs, Hydroponics and Aquaponics Information, September 27, 2018. https://uponics.com/hydroponics-yield/.

Crops

Production has a direct correlation to economic profitability. Growing tall plants in a vertical farm is a waste of space. Crops with a shorter production cycle are the most profitable Year-round demand, one could imagine rotating crops seasonally when the market price for each crop is highest but that makes automation of the growing and harvesting process difficult at best.While theoretically it is possible to grow any plant completely indoors, economic factors limit the realistic set of crops once an grow. Over-estimating demand and supply is an issue for profitability.

Like crops should be grown together. Humidity, temperature, and lighting needs vary depending on crop. Refer to diagram. As a result, crops should be separated also depending on how they grow. Separation based on "maintenance, lighting, temperature, water needs"

Fungi in dank environment in the lower level or in spot in shade. To allow for decomposition and foraging. Fungi breaks down tough organic materials. Apart of nutrient cycling. Plants rely on decomposers to provide them with soluble nutrients

I am looking at transforming this obsolete industrial site into productive food landscapes or foodscapes. Integrating programs that focus on Production, Distribution, and Gathering.

I will be using 3 different growing types used for mass urban production: Hydroponic, Aquaponic, and greenhouse. They all have their own set of requirements like natural light, water source, ventilation, and transparent/ opaque enclosure that will inform the design process.

Yield per 1 Module with 5 Layers

Lettuce

Yield Per Module: 250 Plants
Water PH: 5.6-6.2
Humdity: 60-75%
Temperature (Day): 60-70 degrees
Temperature (Night): 45-60 degrees
Light Exposure: 10-18 hrs

Seed — 9-12 Weeks — Harvest

Herb

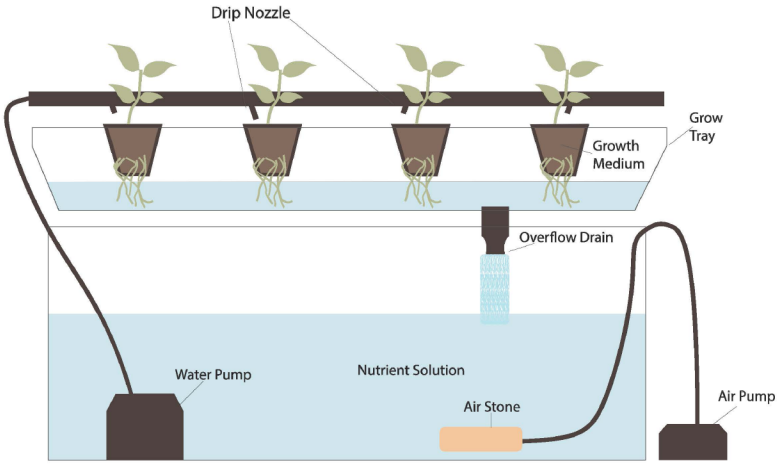
Yield Per Module: 486 Plants
Water PH: 6.2-6.8
Humdity: 50-70%
Temperature (Day): 70-80 degrees
Temperature (Night): 60-70 degrees
Light Exposure: 14-18 hrs

Seed — 8-10 Weeks — Harvest

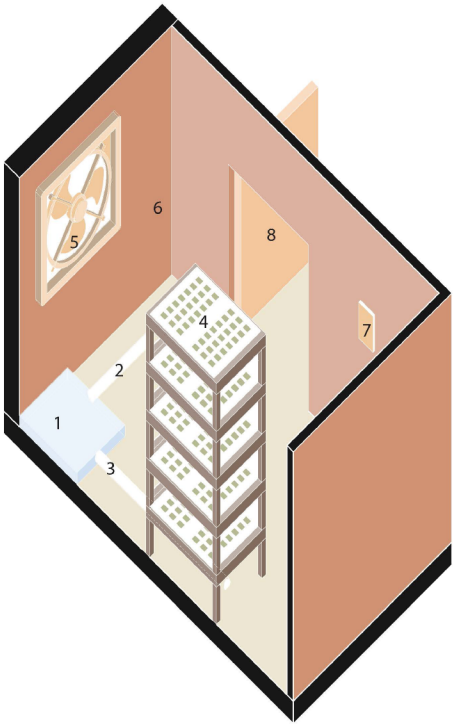
Microgreens

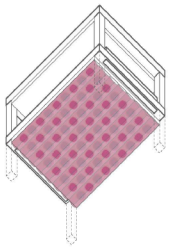
Yield Per Module: 5400
Water PH: 5.6-6.2
Humdity: 45-60%
Temperature (Day): 60-70 degrees
Temperature (Night): 45-60 degrees
Light Exposure: 12-18 hrs

Seed — 3-5 Weeks — Harvest



Hydroponics





1. 40 Gallon Water Tank
   - 8 Gallons per Layer
2. Nutrient Mix-in
3. 2.5" Pipes.
   - Return at 1/4" pitch for gravity Loop
4. Module
   -Provides Lighting under each layer
   -Water pumping through the structure
   - Each layer is 3 x 4 feet.
   -Stackable from 4-8 layers
   - Lighting doesn't overheat
5. HVAC, Constant Ventilation, Fan
6. Completely Enclosed, relies on artificial lighitng, air tight
7. Climate and Humidity Control
8. Private Access.

Tomatoes

Temp: 58-79 Degrees
Humidity: 70-80%
Yield Per Plant: 5-9 lbs
Yield Per Tray: 1760-3500 lbs
Positioning: 1 per sqft

Seed — 10-16 Weeks — Harvest

Bell Peppers

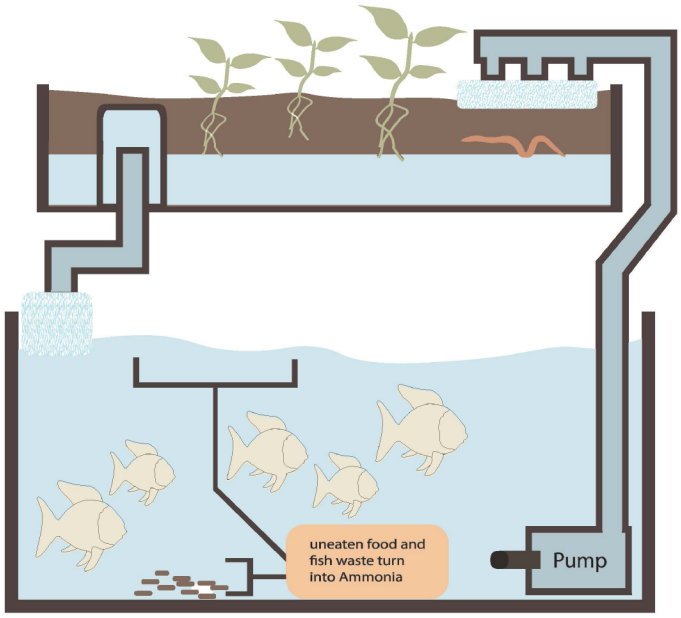
Temp: 60-74 Degrees
Humidity: 50-70%
Yield Per Plant: 4-6 lbs
Yield Per Tray: 1000-1260 lbs
Positioning: 1 per sqft

Seed — 16-20 Weeks — Harvest

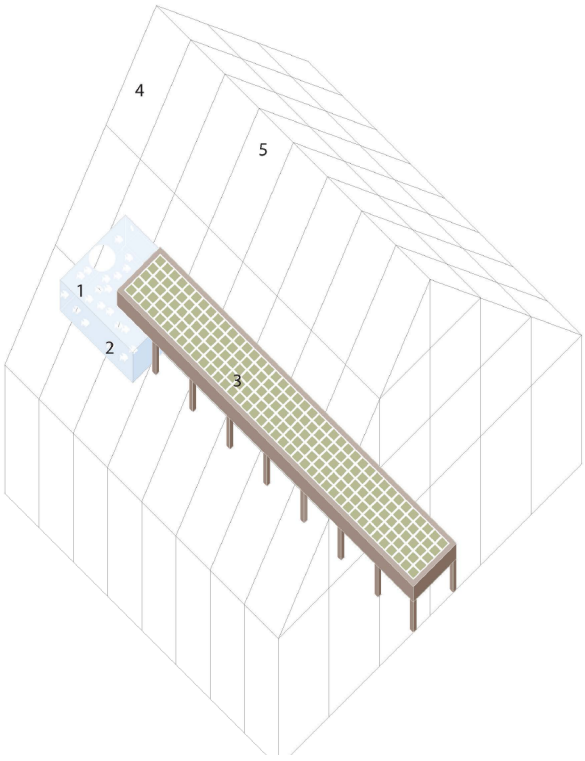
Cucumbers

Temp: 70-80 Degrees
Humidity: 60-70%
Yield Per Plant: 20-25 Cucumbers
Yield Per Tray: 4000-45000lbs
Positioning: 18 in x12in per plant

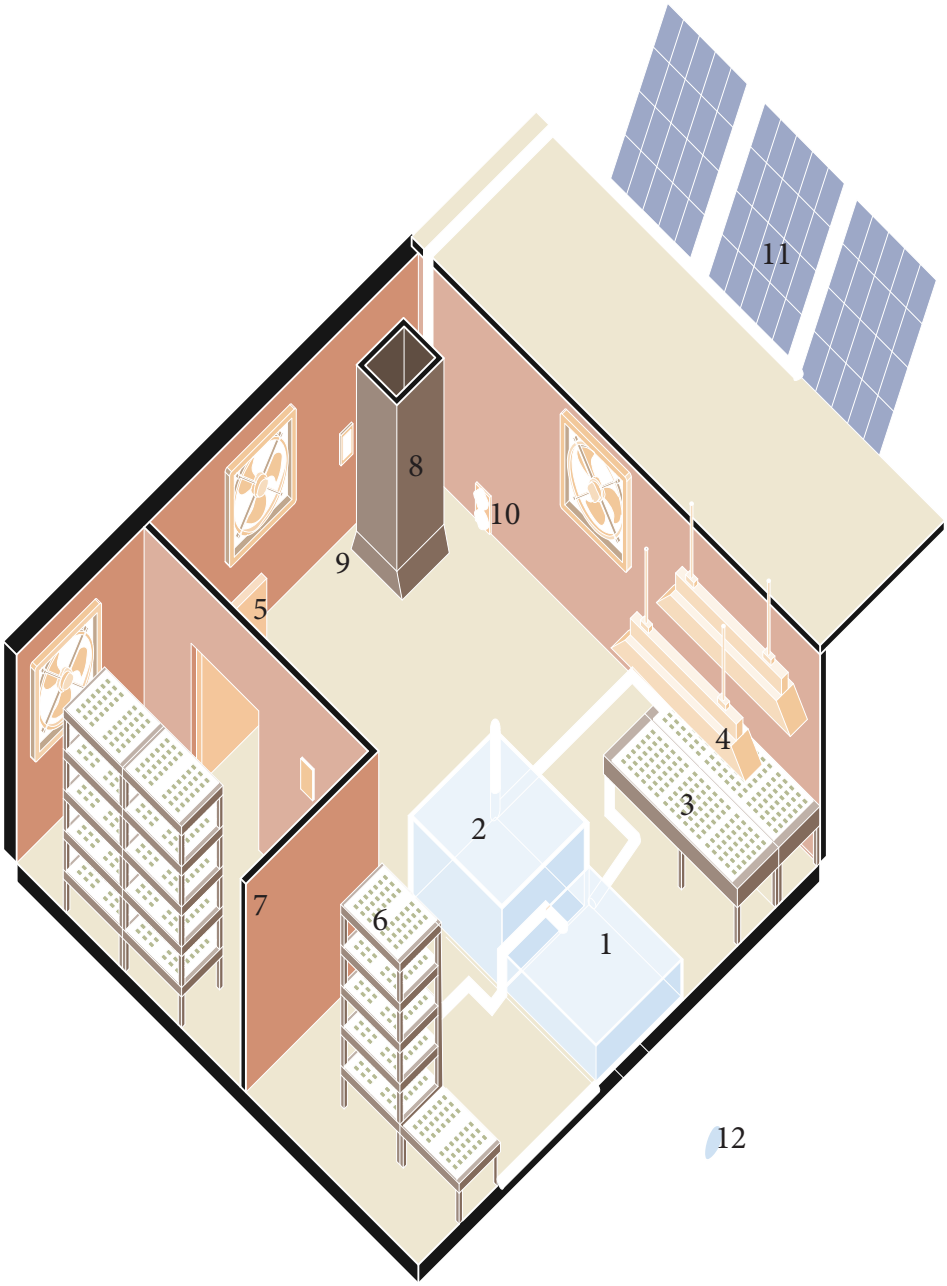
Seed — 9-11 Weeks — Harvest



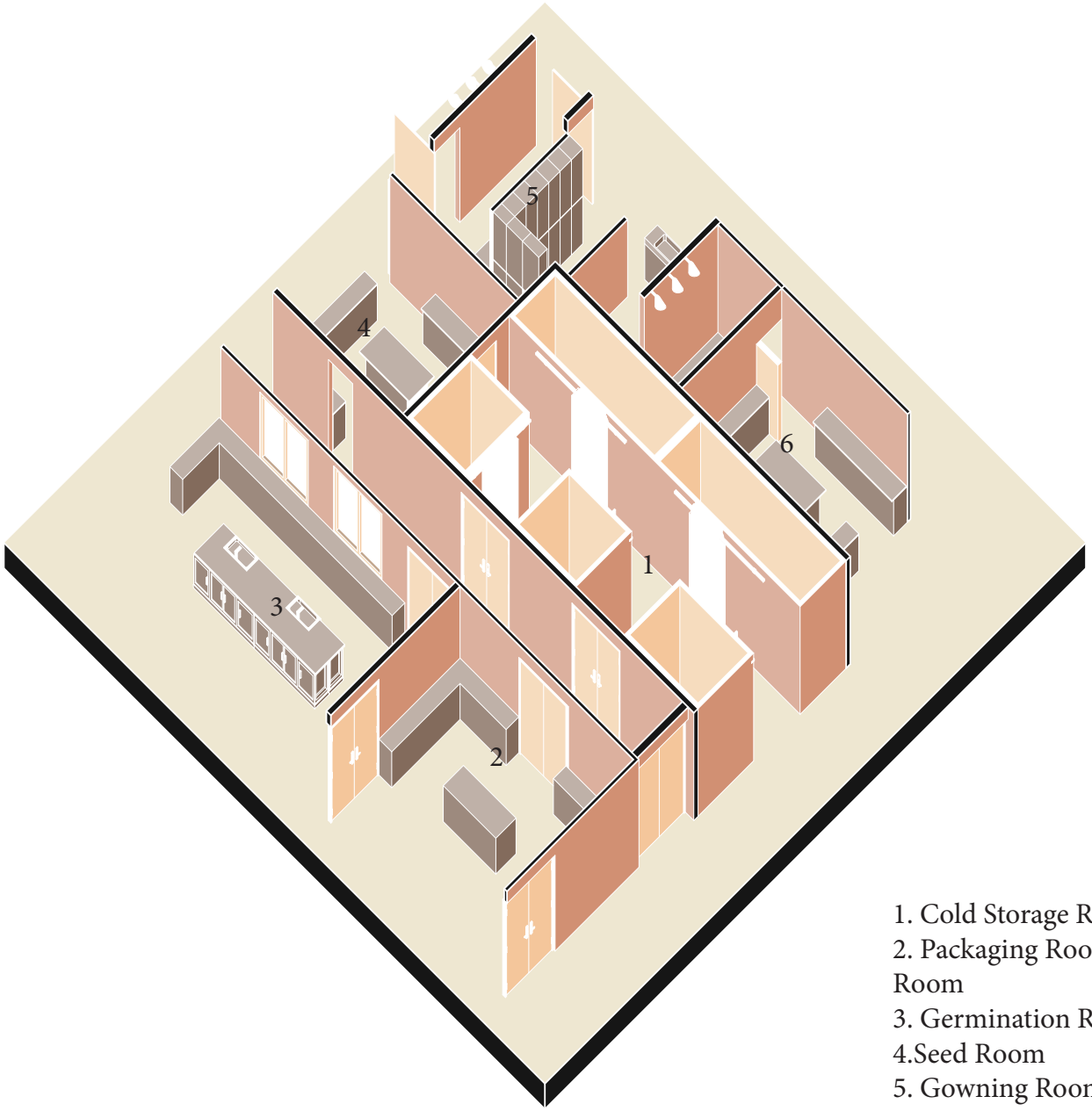
Aquaponics



1. 2000 G Water Tank, 10 Gallons per sqft
   - Closed Loop System
2. Fish, 800 per 1500G.
3. Growing Table is 1.5' deep, 5'x40'. This allows for 200sqft of growing space per table. Amount of plants per table varies. 2.5" piping from the tank to the table.
4. Ventilation and Humidty Control, making certain structural parts operable.
5. Relies on Natural Light, Artifiical light used during winter and parts of the night to fulfill the light demands.



1. Hydroponic Water Storage Tank
2. Aquaponic Water Storage Tank
3. Aquaponic Growing Beds
4. Artificial Lighitng that emphasize the blue and red specturm
5. Fan for air circulation
6. Hydroponic stacked Growing Beds
7. A seperated growing room for crops that have different climate, humidity, or lighting needs
8. Ventilation
9. Thermostat to control temperatire and humdity
10. Electric Outlet to Power the Lights, Beds, and Pumps
11. Passive Design Element to Offset High Electricity use
12. Water Source



1. Cold Storage Room
2. Packaging Room or Harvesting Room
3. Germination Room/Station
4.Seed Room
5. Gowning Room/Wash Station
6. Transplant Room

Beans, Bush

Temp: 60-70 Degrees
Sun: Full
Soil: Sandy
Growing Sapce: 3" apart, 18" per row

Seed — 40-60 days — Harvest

Spinach

Temp: 60-65 Degrees
Sun: Full
Soil: Loamy
Growing Sapce: 12 Seeds per Foot

Seed — 37-45 days — Harvest

Melon

Temp: 65-70 Degrees
Sun: Full
Soil: Sandy
Growing Sapce: 2' apart 2 per row

Seed — 85-110 days — Harvest

Eggplant

Temp: 70-85 Degrees
Sun: Full
Soil: Sandy
Growing Sapce: 2' apart, 3-4' per row

Seed — 50-60 days — Harvest

Carrots

Temp: 60-65 Degrees
Sun: Full
Soil: Sandy
Growing Sapce: 3-4" apart. 1' per row

Seed — 50-95 days — Harvest

Squash

Temp: 65-75 Degrees
Sun: Full
Soil: Loamy
Growing Sapce: 2'-3' apart

Seed — 40-50 days — Harvest

Broccoli

Temp: 60-65 Degrees
Sun: Full
Soil: Sandy
Growing Sapce: 12-20" apart, 3' per row

Seed — 55-78 days — Harvest

Cabbage

Temp: 60-65 Degrees
Sun: Full
Soil: Sandy and Loamy
Growing Sapce: 1-2' per row

Seed — 62-102 days — Harvest

Rhubarb

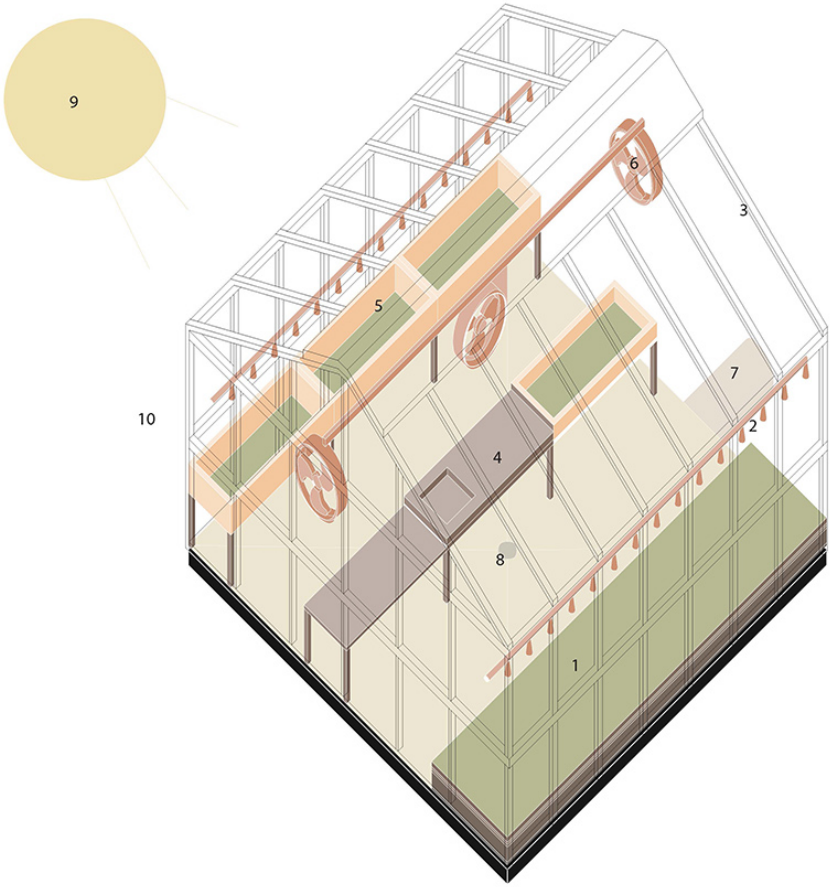
Temp: 65-75 Degrees
Sun: Full
Soil: Sandy
Growing Sapce: 4' per row

Seed — 56-70 days — Harvest

cold weather

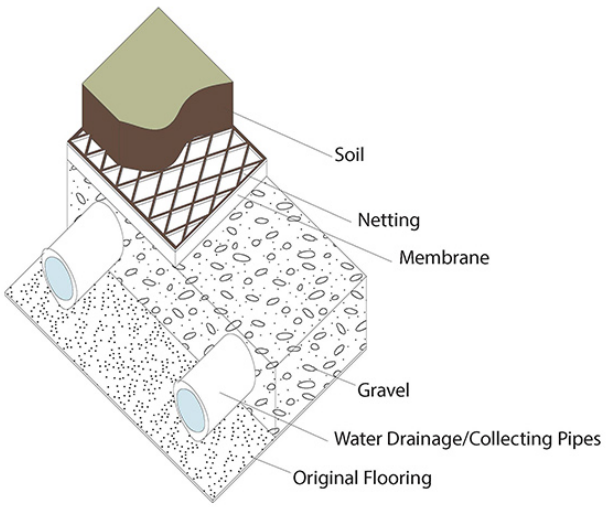
warm weather

Greenhouse

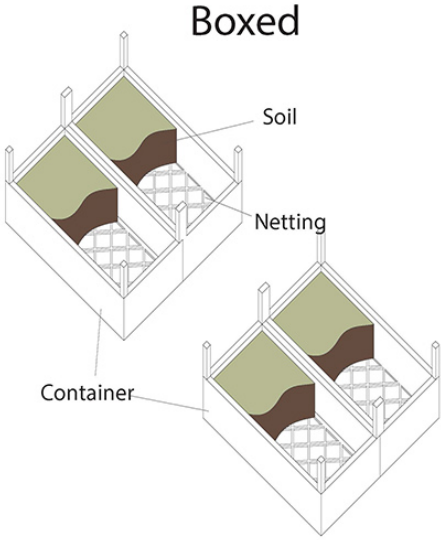


1. Growing Bed Made of Layers
2. Water 8 Gallons per sqft
3. Transparent Facade
   - No Shading
   - Withstand Wind and snow loads
   -Slopes at least 28 degrees
   -Ridges should have a north south orientation to reduce shading from the structure.
   -Electrical lines, irrigation systems
   -Access from pollinators in one area into the greenhouse. Maybe the warm weather one is growing flowers?
   -Divided Between Warm and Cold Weather.
4. Wash and Harvesting Station
5. Growing Boxes
6. Fans for Air Circulation
   - evaporative cooling for humidity
   -ventialtion for the space
   - temperature control
7. Water Source
8. Floor Drain
9. Acess to Natural Light
   - high winter light intensity
10. Semi-Public Access

Ground



Boxed



Non-Crop Plants

Wheatgrass
(Native)

Sweetpepper
Bush
(Native)

Chamomile

Greek
Valarian
(Native)

Butterfly Milkweed
(Native)

Lady Fern
(Native)

Lavender

Sweet Goldenro
(Native)

Sunflower
(Native)

Dutchman Breeche
(Native)

Non-Crop Plants

Trumpet Honeysuckle Vine (Native)

Trumpet Creeper Vine (Native)

Dwarf Lemon Tree

Beach Plum Tree (Native)

PawPaw Tree (Native)

Dwarf Hawthorn (Native)

Sasafrass Tree (Native)

Common Elderberry (Native)

American Hazelnut (Native)

Mushrooms (Native)

Industrial Typology

Stripped back and abandoned, the industrial typology is a sound framing system that has specific characteristics that make it an interesting platform for investigative alteration. This typology is a historical artifact with value.

The Industrial Revolution was an urban global phenomenon. The Industrial City emerged at the end of the 18th century[1]. These sites were geared towards mass production and were the economic backbone of multiple cities within the United States. These sites are a staple in the American architectural vernacular. An industrial site in America is both universal in its design and local. Whether that be through the use of local stone, the context, or the intended product. The typology has a relationship with the natural environment whether that relationship is positive or ultimately harmful. They are historical and current sources of pollution.[2] History hasn't been kind to industrialization especially in the state of current environmental crises, and industrialization is seen as the "destroyer of cities"

The design is utilitarian and was built to accommodate the machines[3]. Originally, the design of these structures didn't necessarily include architects until later or depending on the company. The design was the role of the engineer and the design was functional [4]While the design was very utilitarian there is an intersection between architecture and the industry[5]

1 Hatuka, Tali. (2017). Industrial Urbanism: Typologies, Concepts and Prospects. Built Environment. 43. 1-24. 10.2148/benv.63.3.10.

2 Bergeron, Louis, and Maria Teresa. Maiullari-Pontois. Industry, Architecture, and Engineering. New York, NY: H.N. Abrams, 2000.

3 Bergeron, Louis, and Maria Teresa. Maiullari-Pontois. Industry, Architecture, and Engineering. New York, NY: H.N. Abrams, 2000.

4 Bradley, Betsy Hunter. The Works: the Industrial Architecture of the United States. New York, NY: Oxford University Press, 1999.

5 Aitchison, Mathew. The Architecture of Industry: Changing Paradigms in Industrial Building and Planning. Farnham, Surrey: Ashgate, 2014.

Industry was historically a hub within the city. People moved to the city and created environments around industrial production and created a relationship between work and home.[1]

There are 3 different overarching types of industrial sites, there are: Mills, Sheds, and Powerhouses. These all have their individual characteristics. These sites didn't always consist of just one structure rather the site potentially had multiple structures within it, working together to create a streamlined process from raw material to product[2].
The need for daylight resulted in punctured facades, as a result the parts that were the least lit, like the center, were places of storage.

1 Hatuka, Tali. (2017). Industrial Urbanism: Typologies, Concepts and Prospects. Built Environment. 43. 1-24. 10.2148/benv.63.3.10.

2 Bradley, Betsy Hunter. The Works: the Industrial Architecture of the United States. New York, NY: Oxford University Press, 1999.

These structures are either lone singular buildings or larger multiple acre site. The physical structures are utilitarian and geared towards production. The site of machines, the product and work flow determined the structure's size and characteristics. Formally, these buildings have a similar style regardless of the city. The physical plan and layout of the larger works stressed a limit in travel distances between structure[1].

Location

Many were located near waterways as a source for transportation and/or power generation. Many also were located near railroads or even established their own railroad system that was separate from the railroad that the citizens used to travel. These were called industrial parks. Many cities on the east coast and in the "Rust Belt" were built around the industrial centers and cores. Many featured a gate and utilized the loft buildings to shield the work from public view[2].

Construction

To minimize the oscillation from the vibration of the machines, some loft structures and machine shops had trusses under the floors and had a lattice-type of structure. The walls were load bearing. The column spacing and frame was determined by the machine size and type. The roofs sometimes acted as sites ventilation, light, and equipment support. If multiple stories, these structures had a staircase and elevator system. The interior structure before the late 19th century was wood however , there was a shift to Iron, Steel, or reinforced concrete. This shift was due to the risk of fire. This shift in material also allowed for longer spans. These structures required vehicular access and had some type of fire resistant material in order to respond to the acts being conducted within them. Iron and steel buildings had steel sash windows that had smaller panes, pivoted for ventilation, and were water and air tight. Windows started right above the work bench[3]. The windows were for the penetration of natural light rather than creating a connection to the outside world for the workers. As a result, windows were sometimes located above normal height or eye level.

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1 Bradley, Betsy Hunter. The Works: the Industrial Architecture of the United States. New York, NY: Oxford University Press, 1999.

2 Bradley, Betsy Hunter. The Works: the Industrial Architecture of the United States. New York, NY: Oxford University Press, 1999.

3 Bradley, Betsy Hunter. The Works: the Industrial Architecture of the United States. New York, NY: Oxford University Press, 1999.

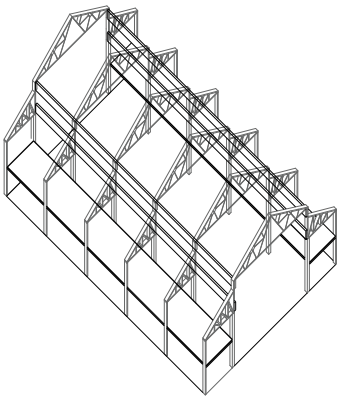
Other Characteristtics

There is usually a water source nearby and a strong electric source. The soil condition was good enough for the foundation of the structure but is potentially polluted after the industry took place. Attached, are water and sewer pipes. A lot of industrial buildings started to integrate a sprinkling system[1]. Many structures included a crane which was a "a hoist with the added capacity of moving the load in a lateral direction; cranes are usually classified by mode of horizontal transfer-rotary or rectilinear"[2]

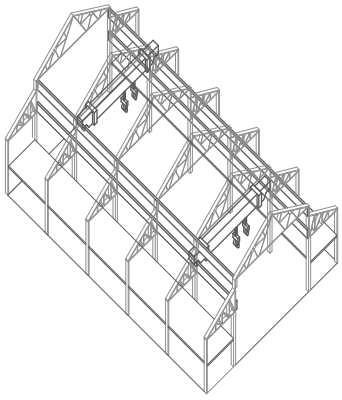
1 Bradley, Betsy Hunter. The Works: the Industrial Architecture of the United States. New York, NY: Oxford University Press, 1999.

2 Bradley, Betsy Hunter. The Works: the Industrial Architecture of the United States. New York, NY: Oxford University Press, 1999.

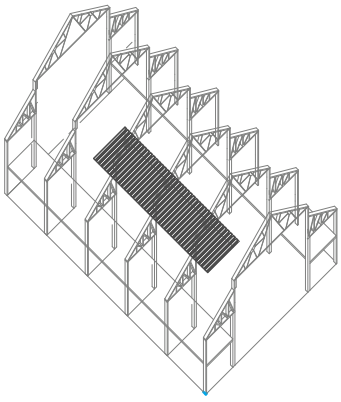
Erection Shop Characteristics



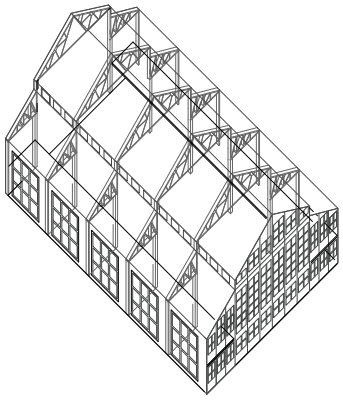
Multi-Story Perimeter



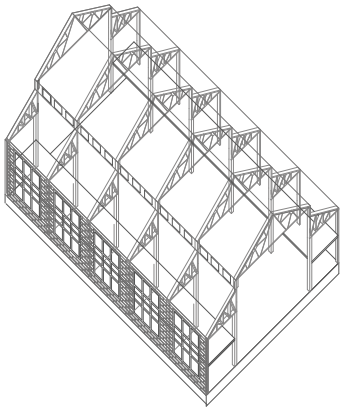
Overhead Crane(s)



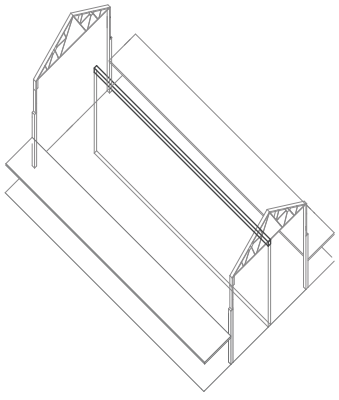
Grated Pit



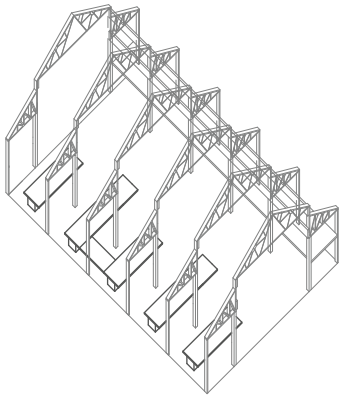
Punctured Facade



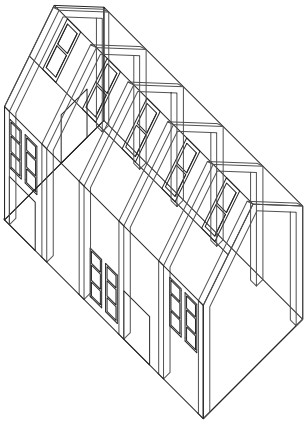
Mateiral and Structure



Central Bay

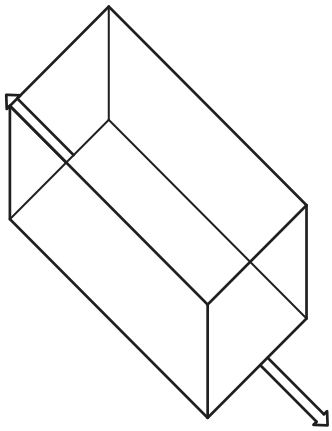


Benches Along Perimeter

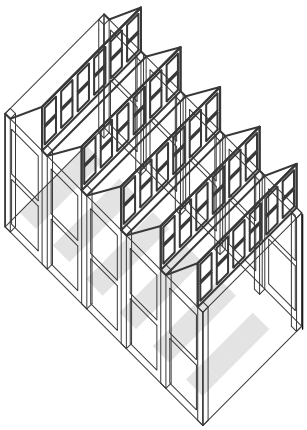


Can Sometimes Be a Boiler Shop

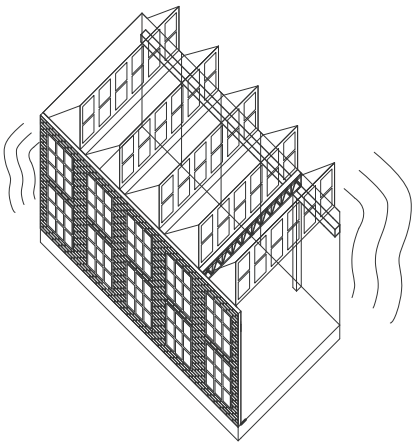
Machine Shop Characteristics



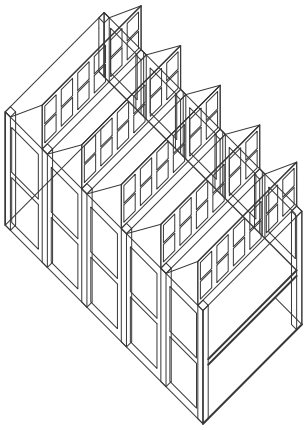
Long Structure



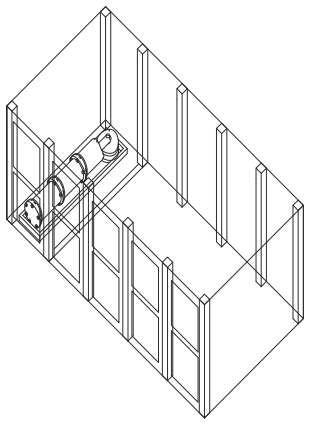
Roof Lighting



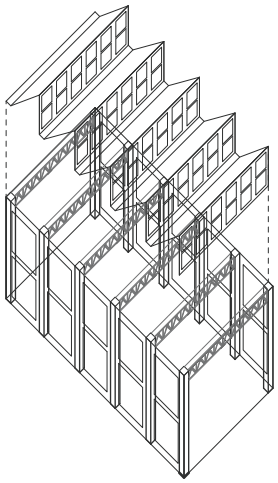
Brick or Stone Exterior
Iron or Steel Interior Frame
Vibration Resistant



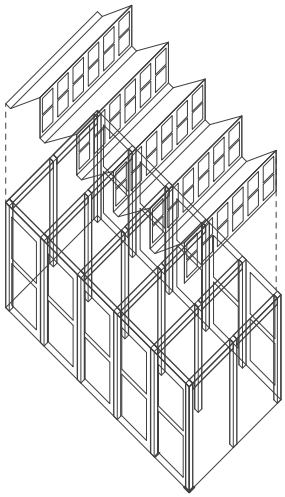
Potential for 2 or 3 Stories



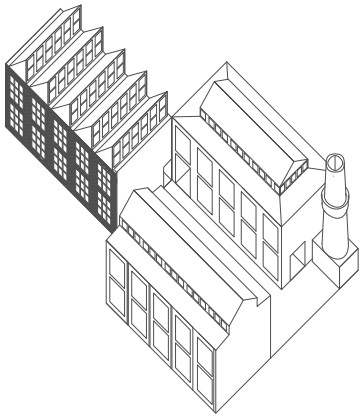
Engine Room



Potential Structure:
Long Span Trusses



Potential Structure:
Interior Row of Columns



Is usually adjacent to other industrial buildings

In doing this investigative research and catalogging of the industrial typology the strucutral components and make-up became very clear. These buildings are mainly open long spanned spaces that have adequate natural lighitng. These structures are also unique in their construction and their similiar design goals allows for these structures to be seen as a connected typolgy regardless of the function. It also shows the transparency in the exterior to the interior structure. Some of these buildings have been adapted as commercial or multi-residential space. Some, have been subjected to ruin and abandonment.

Deindustrialization and Abandonment

A sign of past industry, in the rust belt especially, are parking lots[1]. Deindustrialization has diminished the need for industrial sites in the way they were intended to be used. Industries have either been outsourced or deemed obsolete with the rise of technology. The public has had to watch the deterioration of these sites and as a result has regulated them to being out of order and not productive.

Industrial Landscapes are debris from the past and remnants of a lost or forgotten purpose. Industrial typology has been rightfully exposed for its hazardous effects however, it is time to transform the narrative in a way that doesn't erase history but rather ushers in a new beginning. Society is stuck in the typical order of "assigned places"[2]. A forest, for example, exists within the wilderness. A rat exists within the sewers. Things exist with location. A farm exists outside of the city center. Industry typically exists within a perceived and sometimes actual toxicity.

Industrial Sites have had a dirty connotation to them for a long time. People like Ebenezer Howard deemed industrialization as unhealthy and an ill of modernism. He proposed the garden city as foil to the industrial city.[3] However, with the fall of the industrial production and with the lack of emergence of the garden city there is an opportunity to transform the concept of a productive landscape into a site that was deemed hazardous or unfit for a productive contribution to society. The binary of garden and industry should be blurred as a way of revisiting temporal history of decay. Instead of aestheticizing the decay, look at the potential it has for natural and human life.

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1 Aitchison, Mathew. The Architecture of Industry: Changing Paradigms in Industrial Building and Planning. Farnham, Surrey: Ashgate, 2014.

2 Edensor, Tim. "Waste Matter - The Debris of Industrial Ruins and the Disordering of the Material World." Journal of Material Culture 10, no. 3 (November 2005): 311–32. doi:10.1177/1359183505057346.

3 Hatuka, Tali. (2017). Industrial Urbanism: Typologies, Concepts and Prospects. Built Environment. 43. 1-24. 10.2148/benv.63.3.10.

"At what point does the building stop being a building and turns into a ruin, losing its integrity?"[1]

Industrial sites and zones are places of ultimate order in their construction with each detail being made for the machine and process. Once abandoned, their universal nature create sites of blurred programmatic containment. The built environment is ordered in a binary of productivity. Items that are in ruin are considered waste and useless. With this binary comes a lack of effort to recycle. When in ruin, an industrial building will lose some its character over time. When items intrude upon the order that we as a society have constructed, then these places become recontextualized. For example, ivy is a sign of overgrowth and introduces upon spaces it shouldn't. Once there the buildings are redefined as old or in ruin when ivy becomes visible.[2]

The industrial ruins that are abandoned range from toxic to benign or from gigantic to human scale. Once these industrial sites close down, they are dropped from the network they were attached to and the network dries up and gets built over[3]. These ruins can be defined as feral (untamed, untrained, wild, unrestrained). A Coal Mine in Denmark filled its holes with groundwater that in turn formed some lakes, planted conifers with sand piles. This attracted Red Deer and Wolves and now is wild countryside. This productive landscape was done in stages and this industrial ruin is now serving an environmental purpose and its visual aesthetic has been softened. There are affective ruins and ineffective ruins, there are ruins that are autonomous and ruins that are contextual. [4]

Vegetation, like weeds, grow without human intervention. Nature can and will grow regardless of intention. Within a ruin, where there is a sizeable lack of human interaction, vegetation is able to grow freely.

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1 Otero-Pailos, Langdalen, Arrenhuis, eds., Experimental Preservation, "The Venice Meeting", pp. 70-99

2 Edensor, Tim. "Waste Matter - The Debris of Industrial Ruins and the Disordering of the Material World." Journal of Material Culture 10, no. 3 (November 2005): 311–32. doi:10.1177/1359183505057346.

3 Edensor, Tim. "Waste Matter - The Debris of Industrial Ruins and the Disordering of the Material World." Journal of Material Culture 10, no. 3 (November 2005): 311–32. doi:10.1177/1359183505057346.

4 Nils Bubandt and Anna Tsing "Feral Dynamics of Post-Industrial Ruin: An Introduction, "Jounral of Ethnobiology 38 (1), 1-7 (March 2018), https://doi-org.libezproxy2.syr.edu/10.2993/10.2993/.0278-0771-38.1.001

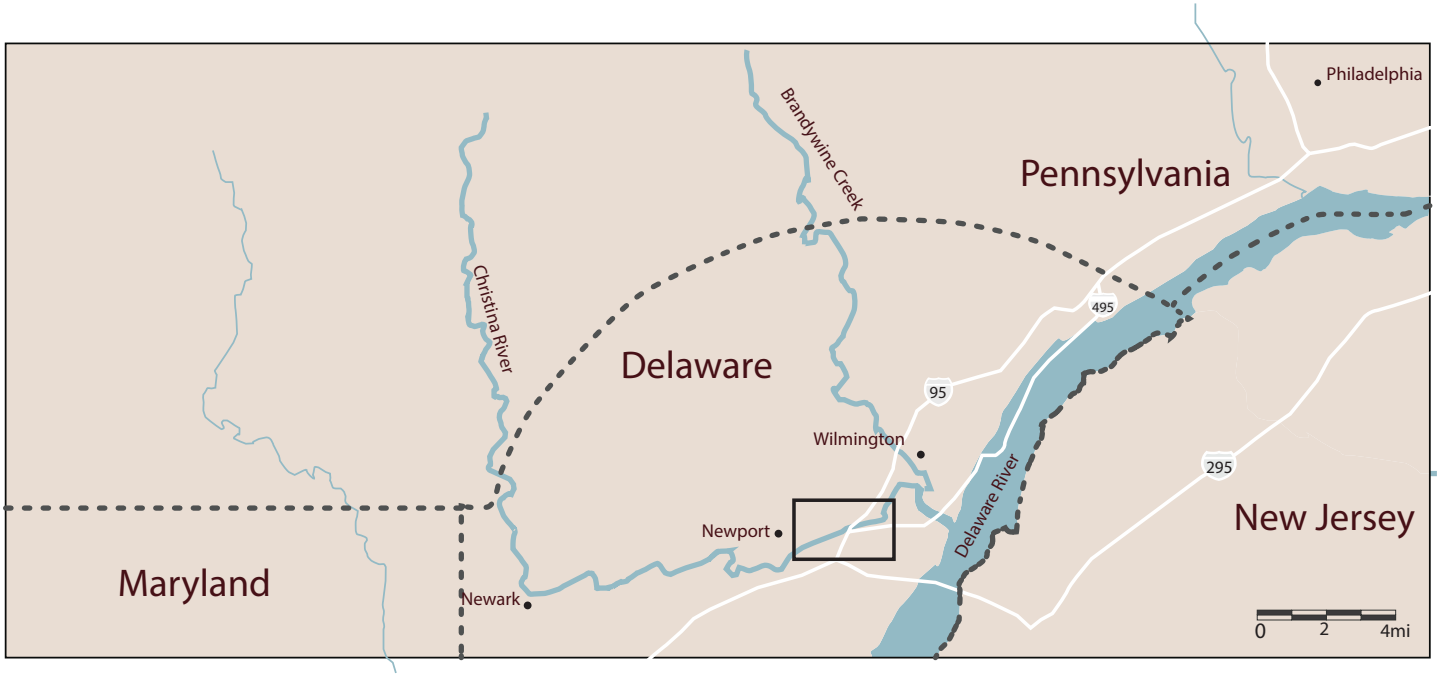
Site

Wilmington, Delaware was established as a port city very early into its history. Its connection to Philadelphia by train or by boat was the main driver. However during the mid-20th century Wilmington was hit with an economic shift and de-industrialization. Many industrial companies were forced to close down and left the river and water front neglected and polluted. The waterfront was inaccessible for a long time. [1]

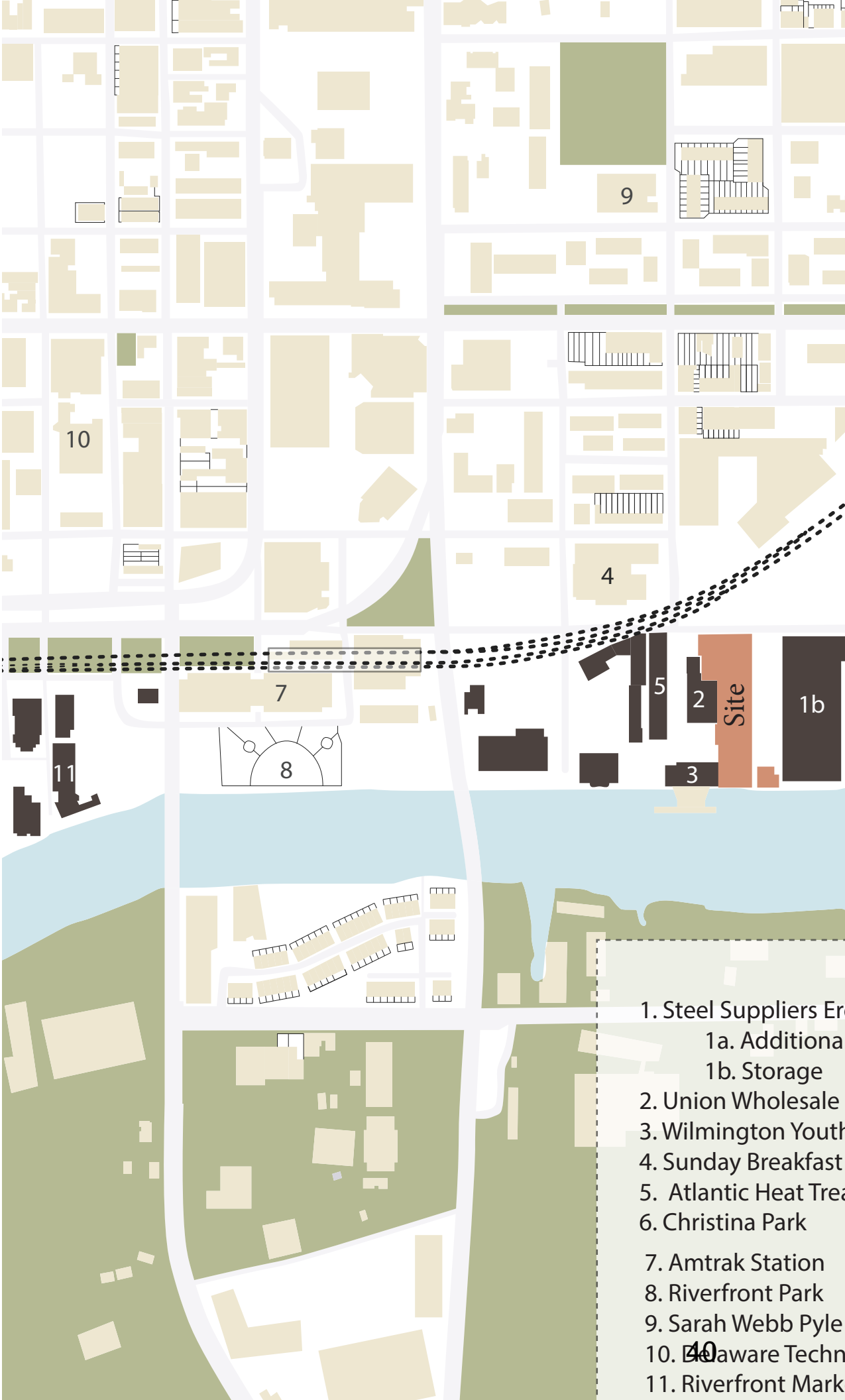
The Pussey and Jones company covered 7 acres and was a large shipbuilding, manufacturing, and paper machinery site[2]. The company went bankrupt the 1960s. The Carney Machine company operated in a part of it for a couple decades but closed shop in 2012. The site has transformed over the years, parts that were recently open have recently been enclosed and some buildings no longer exist. The site is an abandoned and connected complex of 5 industrial buildings. They were machine shops, erection shops, and engine room. They have a clear relationship to the shipbuilding and riverfront activity that exist on the site. After a couple decades of reduced productivity, post world war 2, the site fell into ruin and abandonment. This area used to be apart of the heart and soul of the city and its main economic center. However, once these industries became obsolete the built structures followed suit. While some buildings along the riverfront have been sites of adaptive reuse specifically residential and office programs, none of them attempt an agricultural program.

1 "Images of America." Images of America Series. Accessed January 10, 2020. https://www.arcadiapublishing.com/series/images-of-america-books.

2 "Images of America." Images of America Series. Accessed January 10, 2020. https://www.arcadiapublishing.com/series/images-of-america-books.



Historical Site Picture



1. Steel Suppliers Er
1a. Additiona
1b. Storage
2. Union Wholesale
3. Wilmington Youth
4. Sunday Breakfast
5. Atlantic Heat Trea
6. Christina Park
7. Amtrak Station
8. Riverfront Park
9. Sarah Webb Pyle
10. Delaware Techn
11. Riverfront Mark

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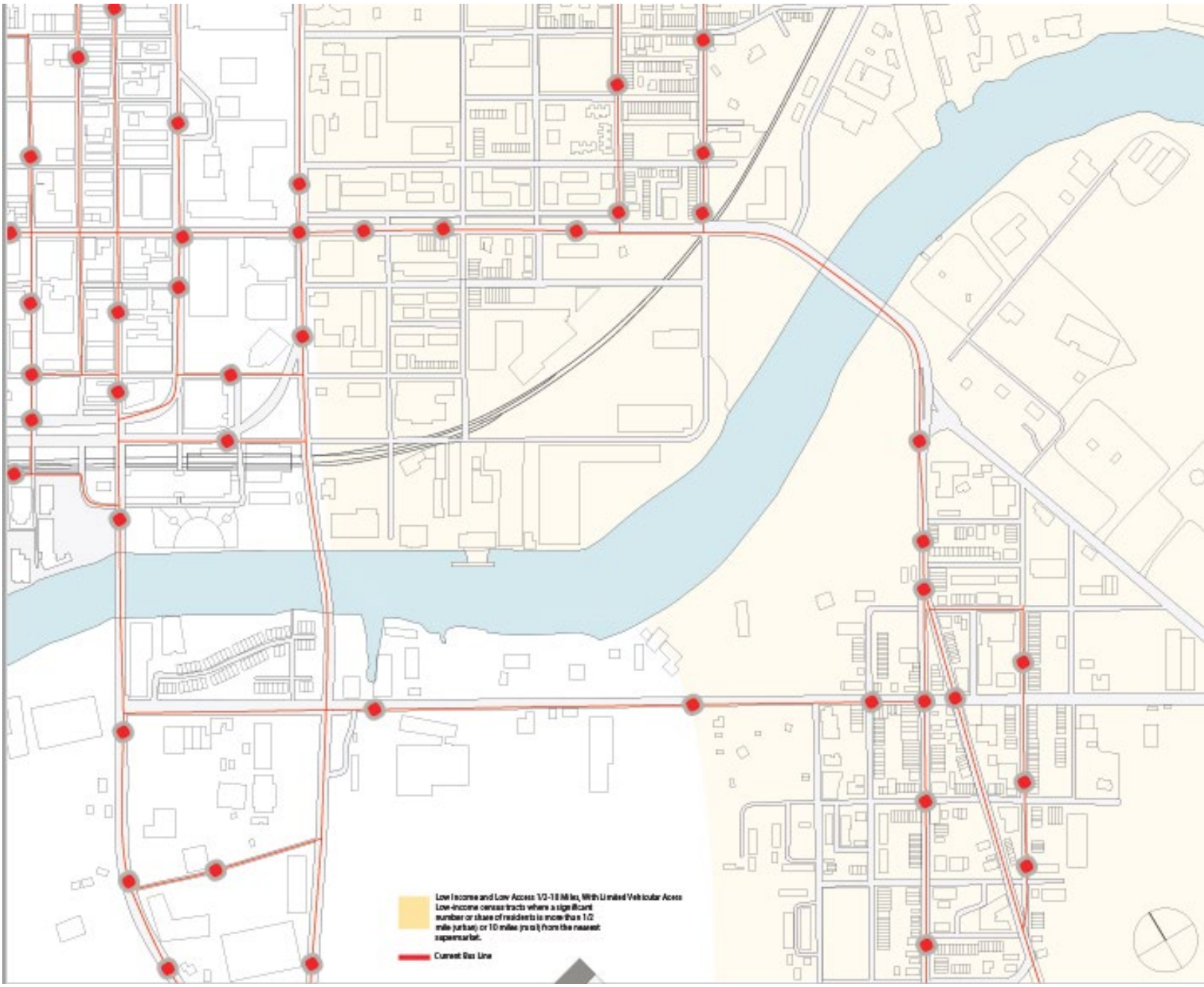
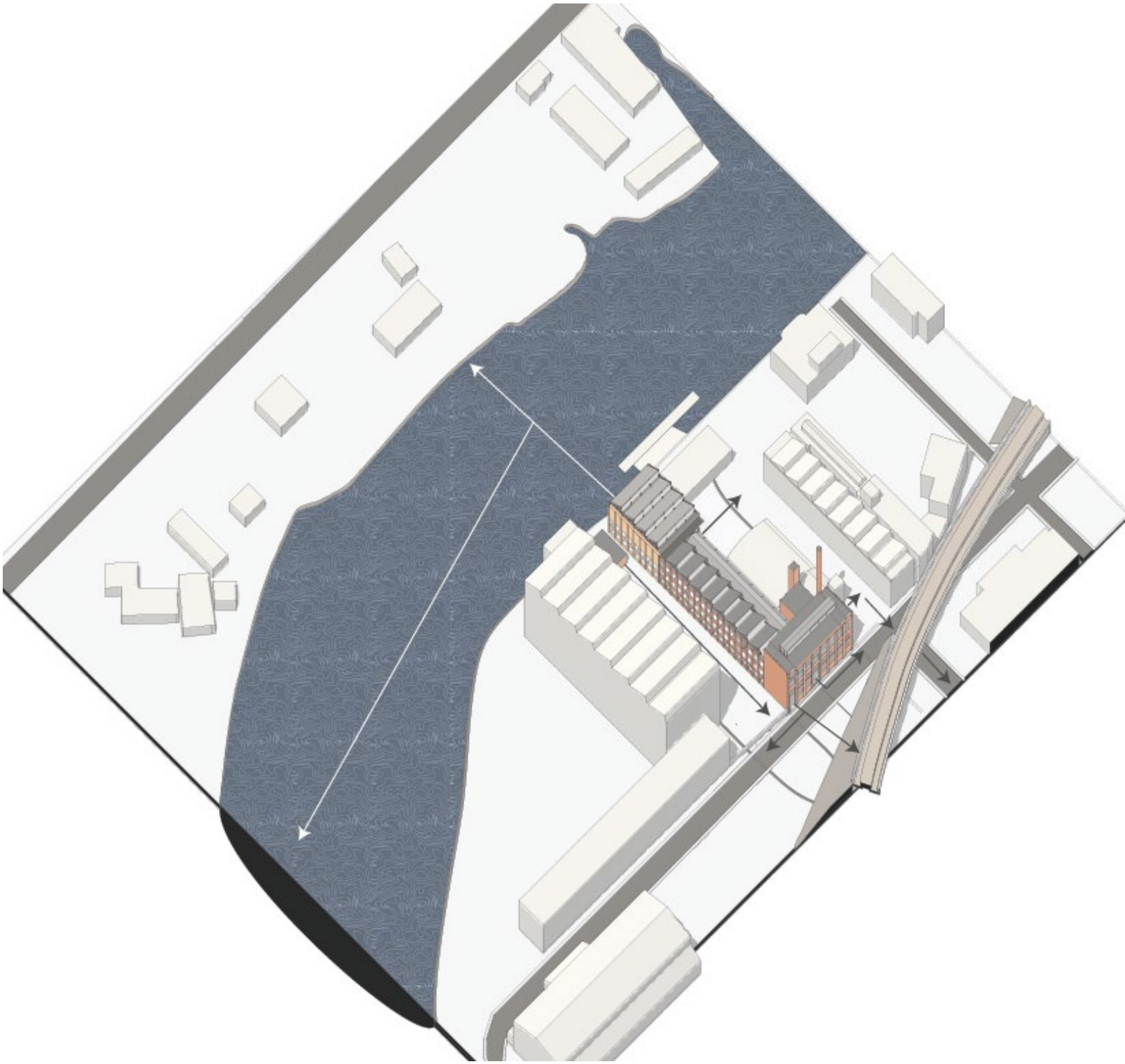


The site of the project is located in Wilmington Delaware, which like many other eastern cities along a body of water had a thriving industrial center in the late 19th and early 20th century. Since then however, the site has fallen into decay and non-engagement. It is located within a food desert and a low income area. The transit lines do not interact with the site. Both access and resources do not touch it. Community Gardens exist but are limited access, are not useful on an annual basis, and only benefit 5-15 houses. This site and area lacks a agricultural production center.



Site Axon

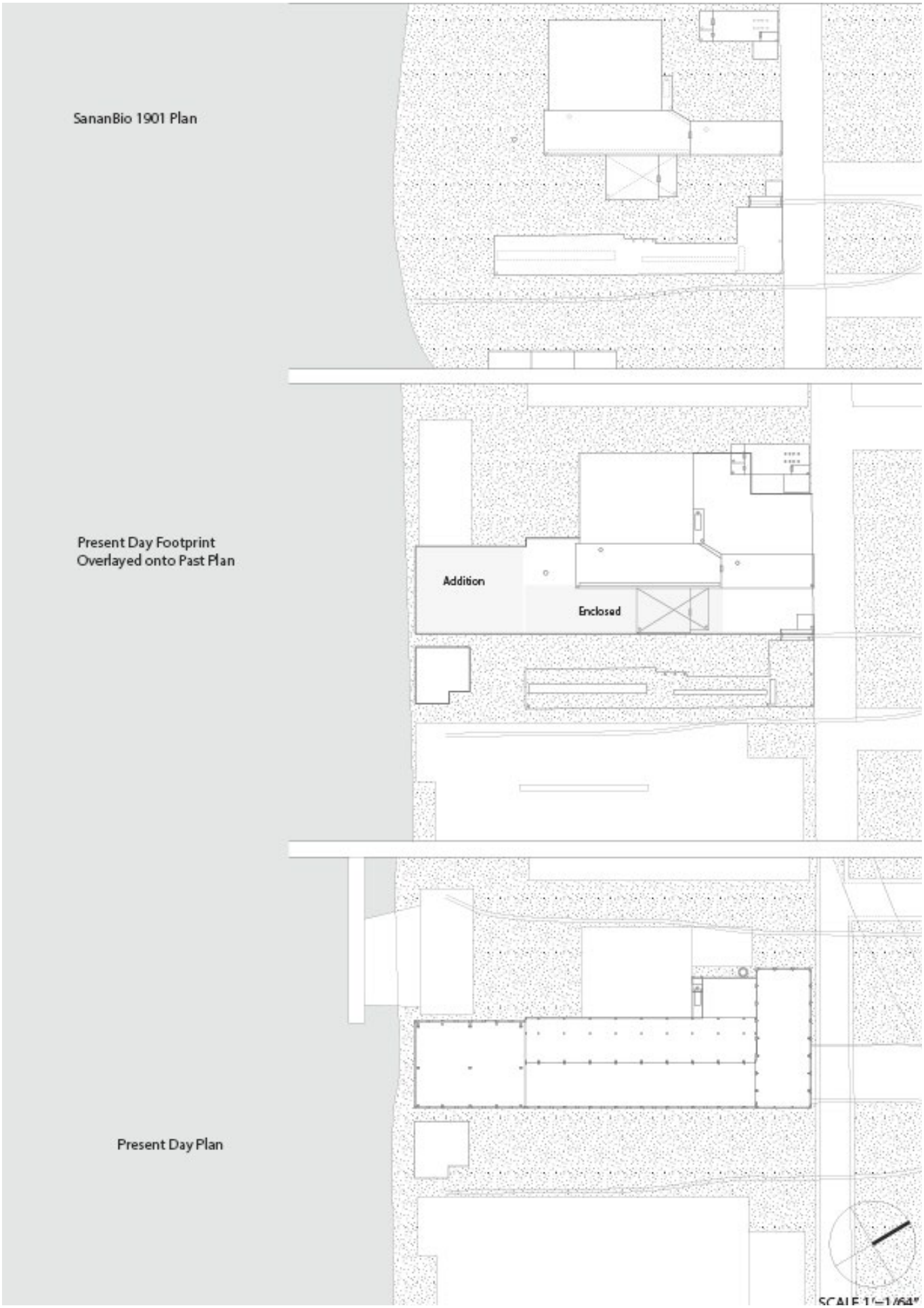
SananBio 1901 Plan

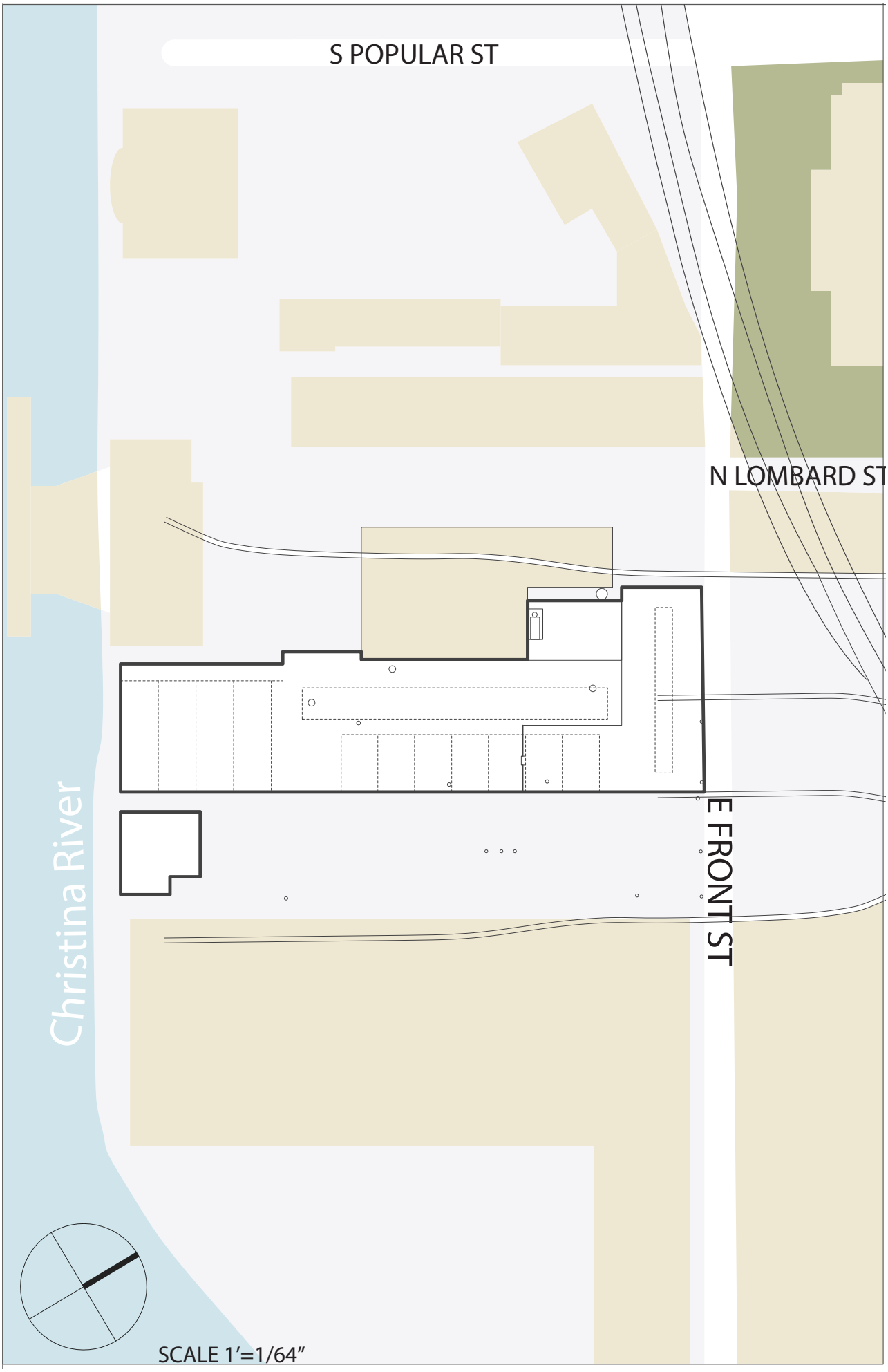
Present Day Footprint
Overlayed onto Past Plan

Addition

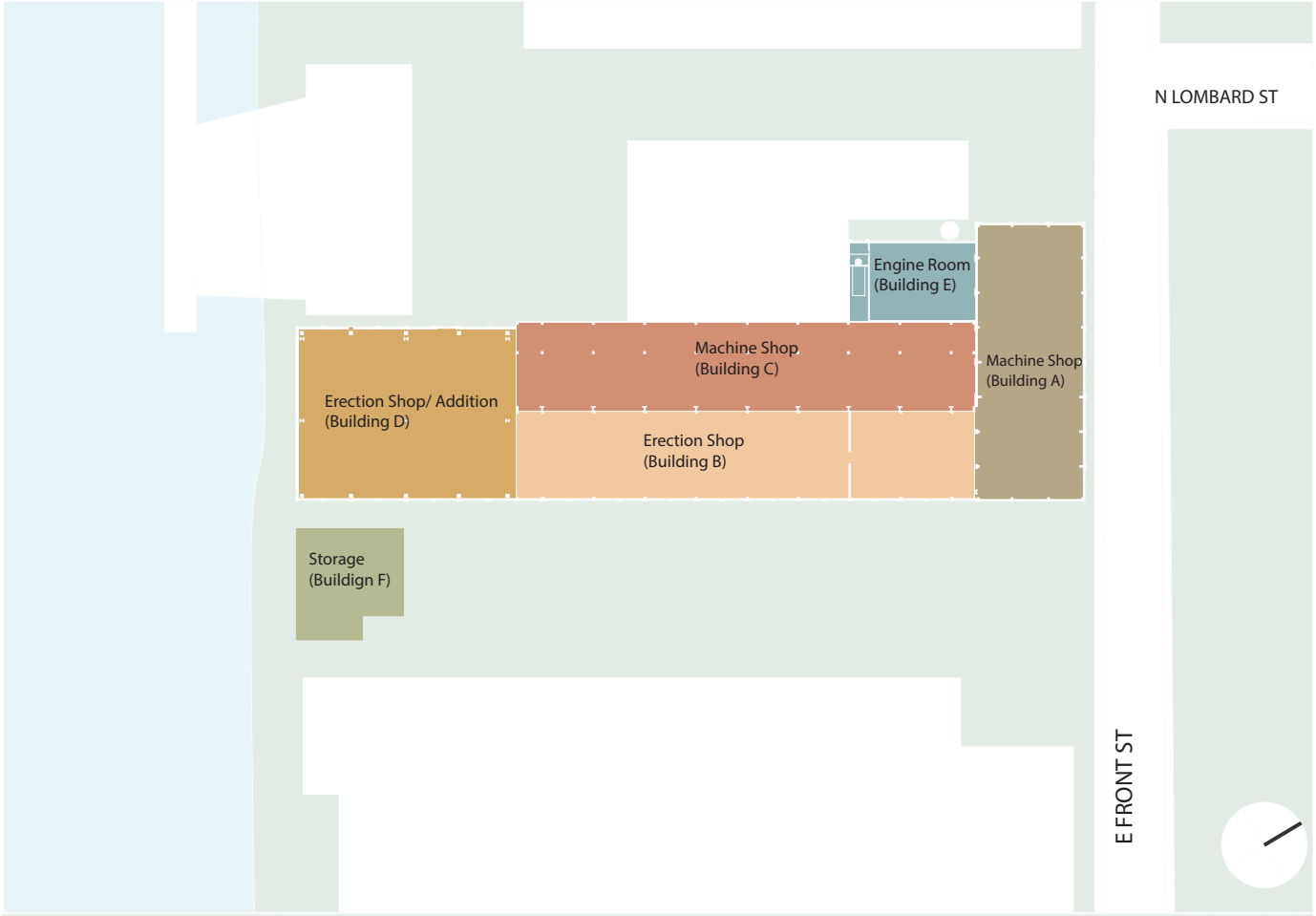
Enclosed

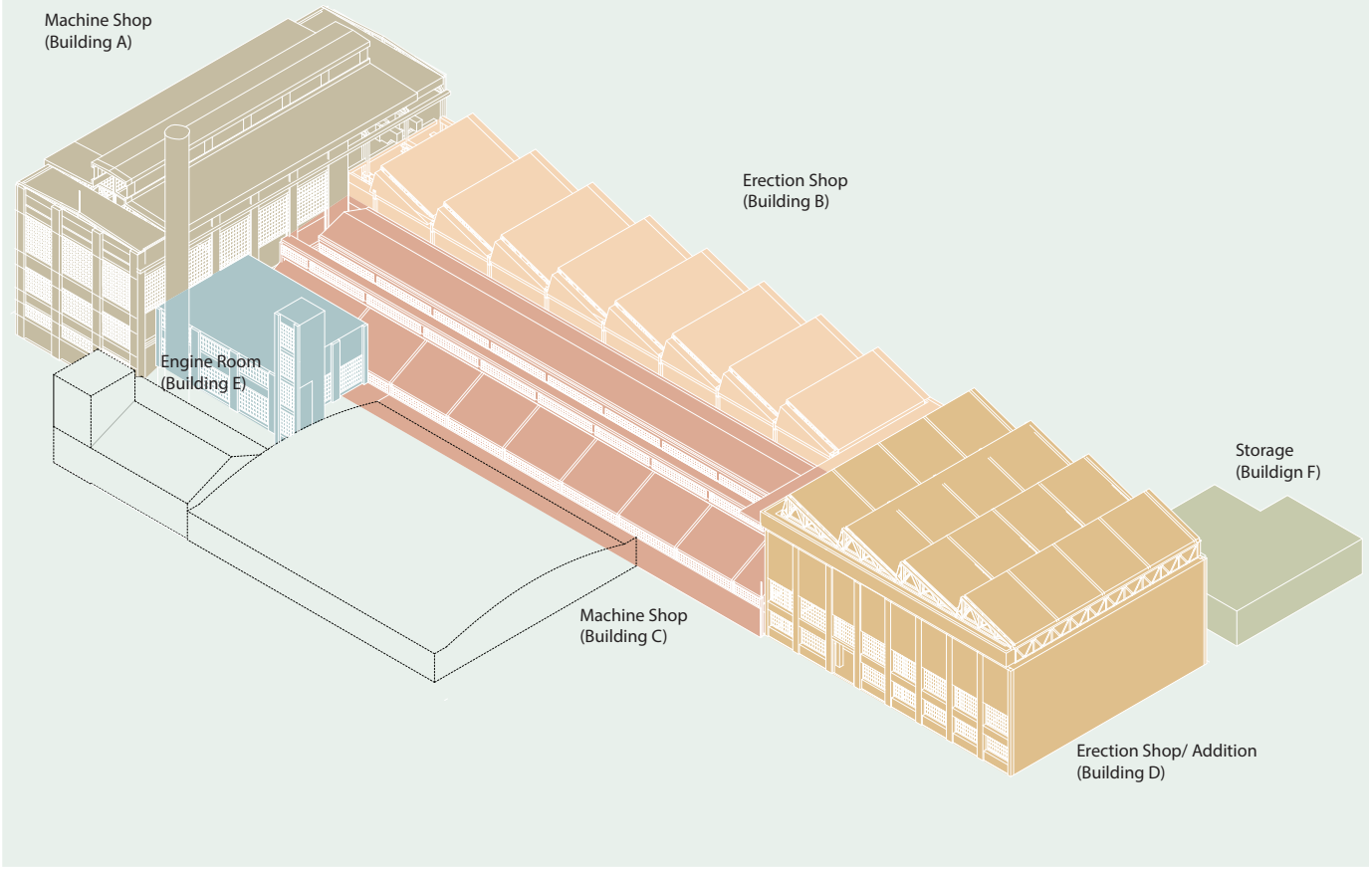
Present Day Plan

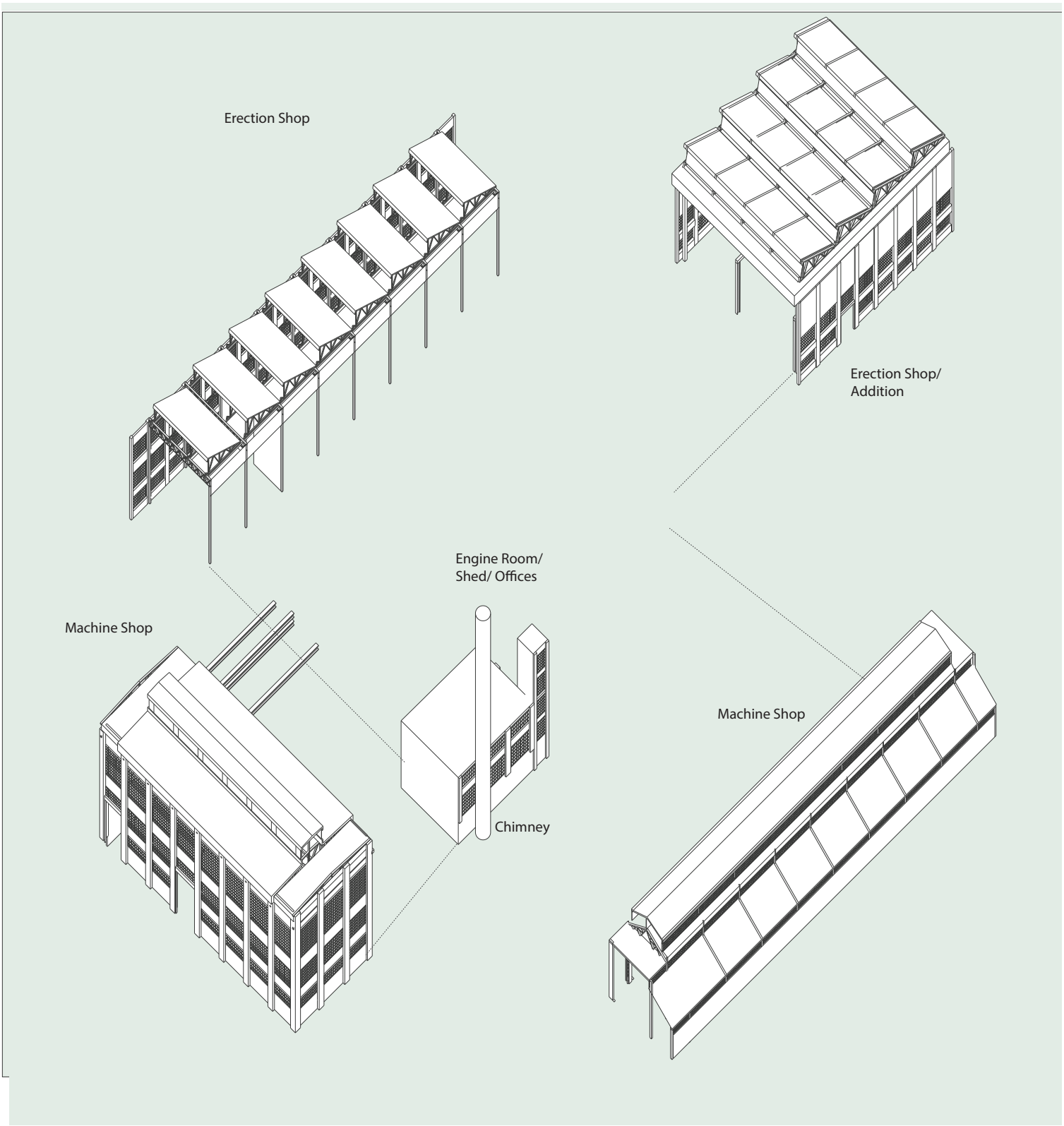


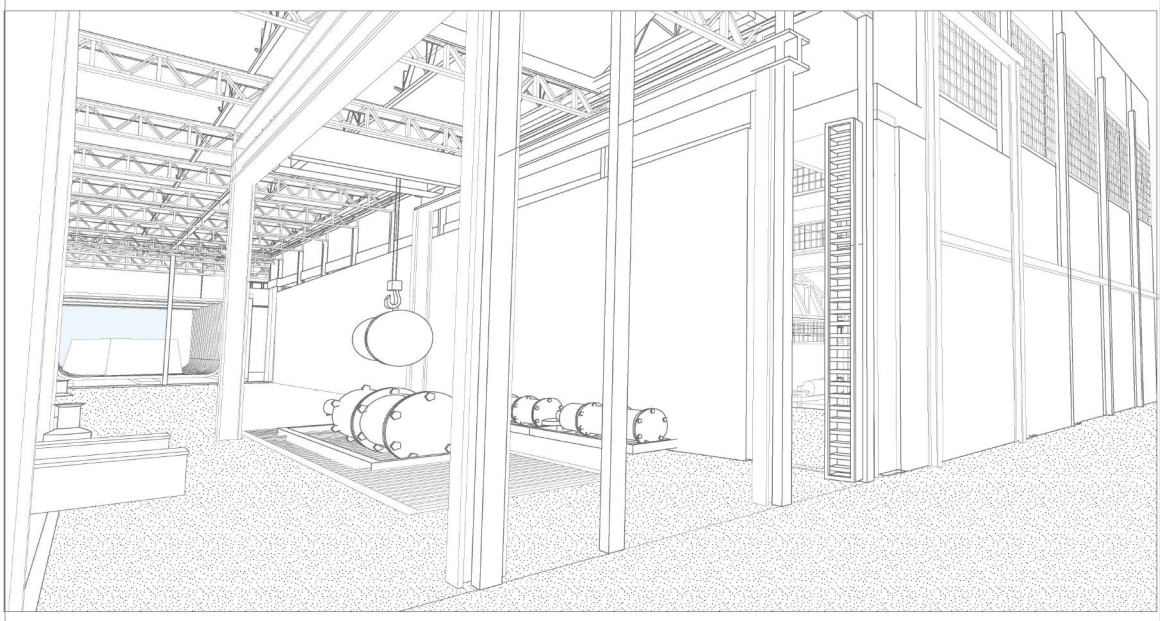


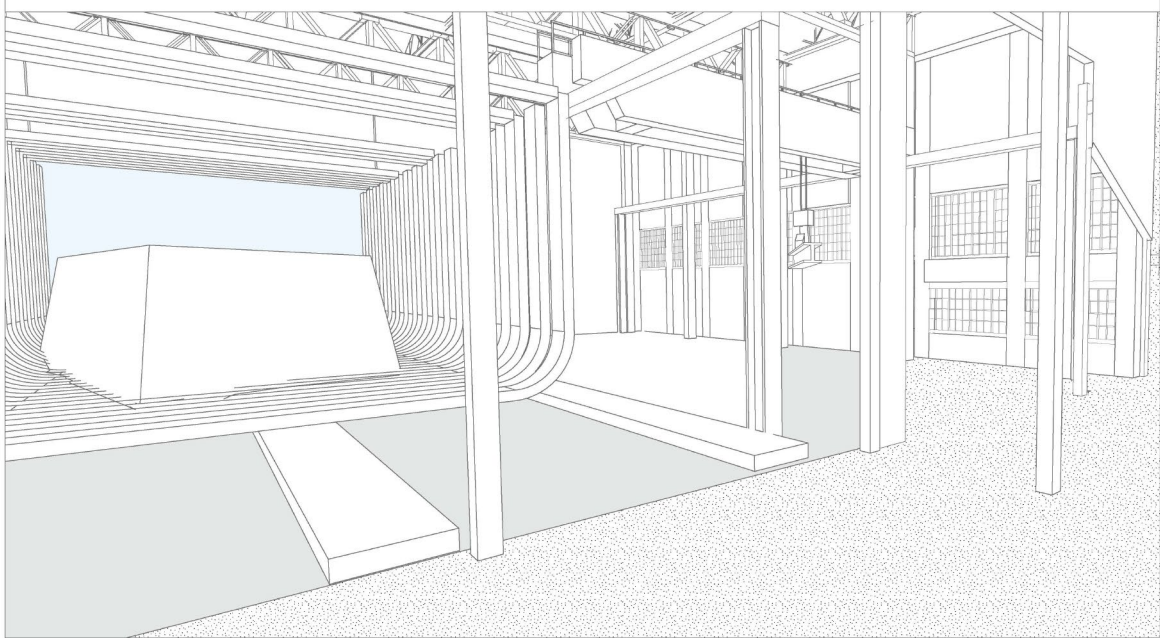
Present Day Plan


N LOMBARD ST
Engine Room
(Building E)
Machine Shop
(Building C)
Machine Shop
(Building A)
Erection Shop/ Addition
(Building D)
Erection Shop
(Building B)
Storage
(Buildign F)
E FRONT ST


Machine Shop
(Building A)
Erection Shop
(Building B)
Engine Room
(Building E)
Storage
(Buildign F)
Machine Shop
(Building C)
Erection Shop/ Addition
(Building D)


Erection Shop
Erection Shop/
Addition
Engine Room/
Shed/ Offices
Machine Shop
Chimney
Machine Shop





The Historical Sequence was rectilinear and pragmatic. It relied on the technology being fabricated and produced as way to define the space.

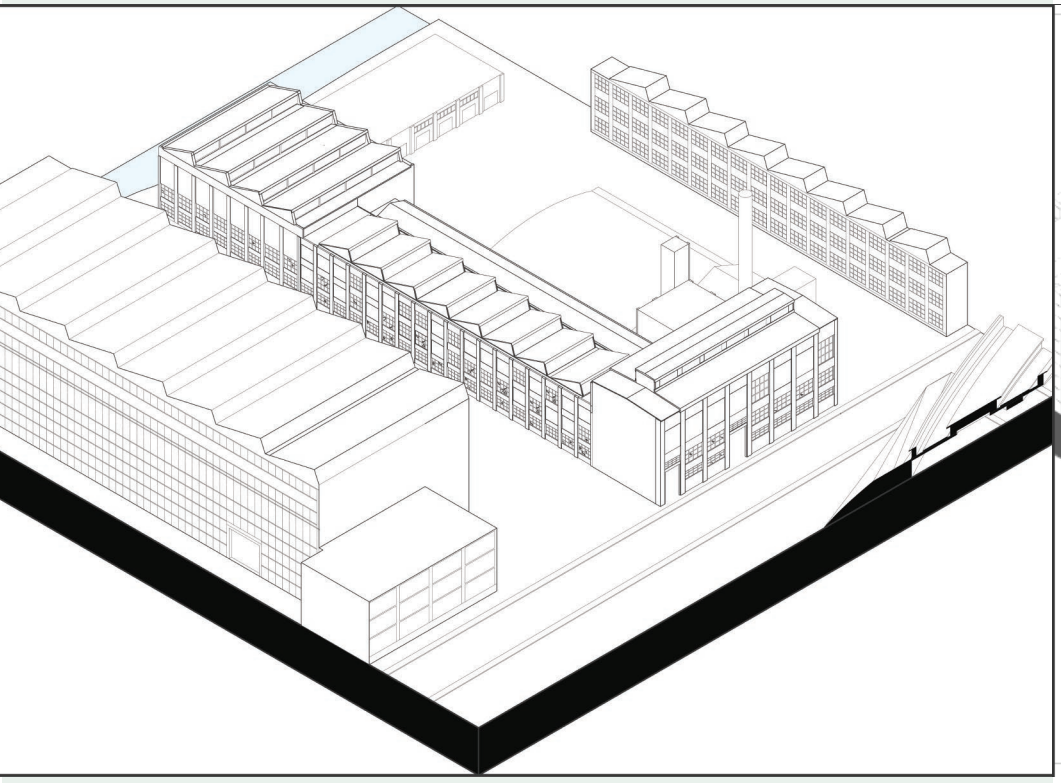
Ruination reveals and strips back the building to a frame and structure. The process of stripping back includes removing the rotten aspects of it. Ruination rots at and eats away the excess and superficial parts of the project. The substantial pieces of the structure remain. This "host building" can then be a launching point for a further speculation[1]. The artsits and architects of the past established the imagery of ruin as an ideal but the ideal is rooted in fact. "Dr Kinsey once remarked there are only variations, sattelites as it were of the model. Variation and the ideal are thus inseparably twinned with the other"[2]. Opposite to Kahn, Arthur B Evans in the instances of Knossos constructed a fantasy ruin[3]. This would be the other end of the "ruin as architecture" spectrum. In the middle of these opposing views is the viewpoint that a building can be one thing and through ruin start a process of becoming something else. "I want to suggest a different logic of ruin which is not romantic, not baroque, not melancholic, but a form of toleration of disharmony- a toleration of plural modernities with which we live"[4]. This speculates a productive ruin that utilizes its historical set pieces to facilitate a new program.

1 Scott, Fred. On Altering Architecture. London: Routledge, 2008.
2 Scott, Fred. On Altering Architecture. London: Routledge, 2008.
3 Otero-Pailos, Langdalen, Arrenhuis, eds., Experimental Preservation, "The Venice Meeting", pp. 70-99
4 Otero-Pailos, Langdalen, Arrenhuis, eds., Experimental Preservation, "The Venice Meeting", pp. 70-99

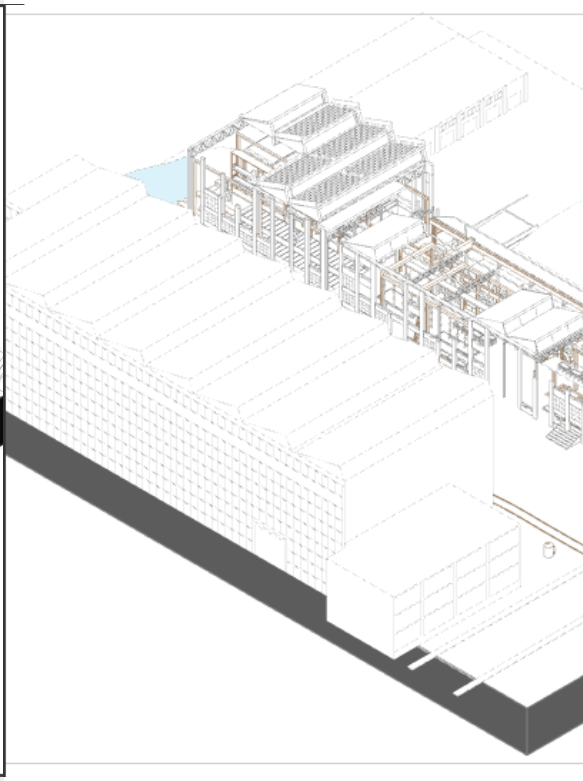
Design Intervention

Artists like Piranesi saw and represented ruin in their fragmented state while still retaining the essence of the site they chose to draw. Each building typology has specific artifacts that identifies it as to what it is. These artists rewrote the original building's intent, narrative, and activation. In the proposed ruin, they repurposed it into a site that was both integrated into the landscape and accessible. The boundaries of private and public and conversely structure and nature were blurred.

Abandoned Ruin

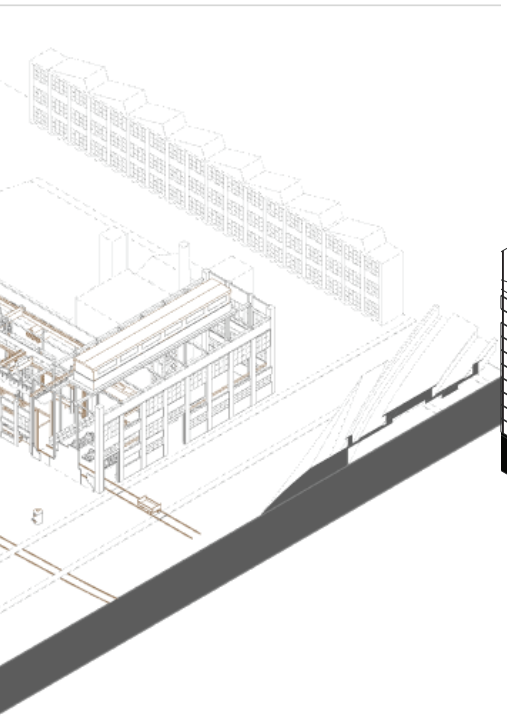


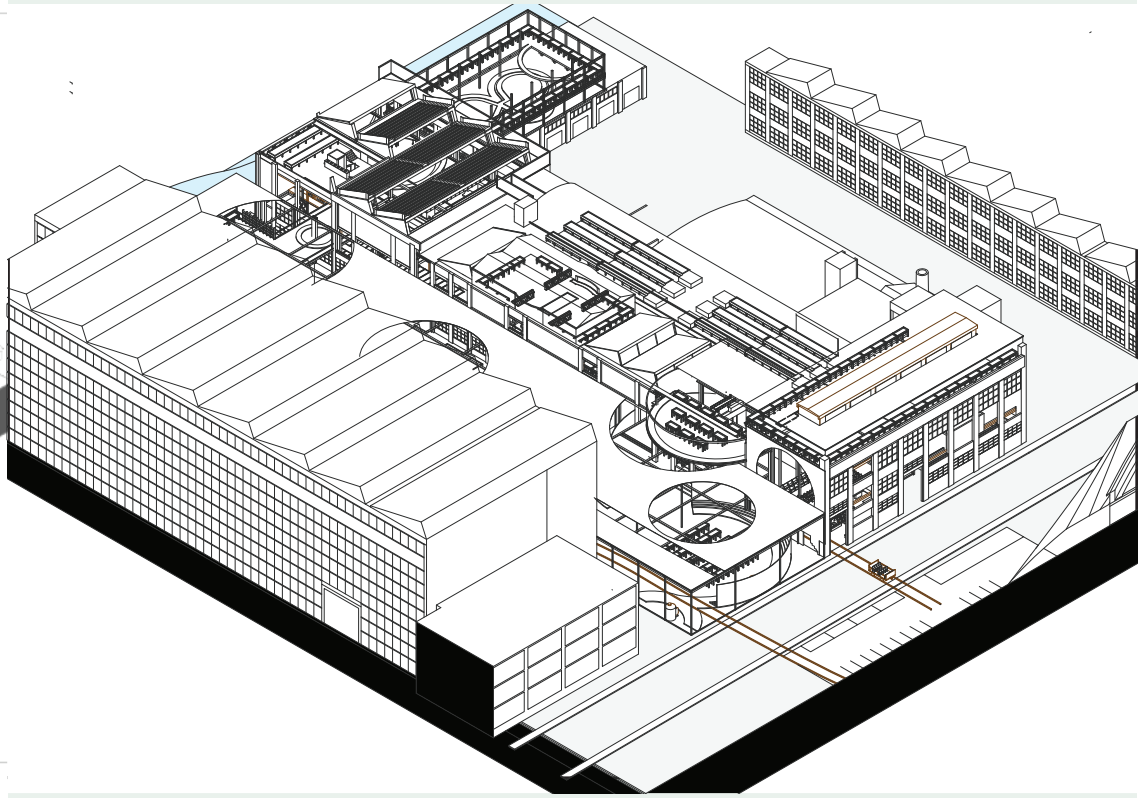
Stripping

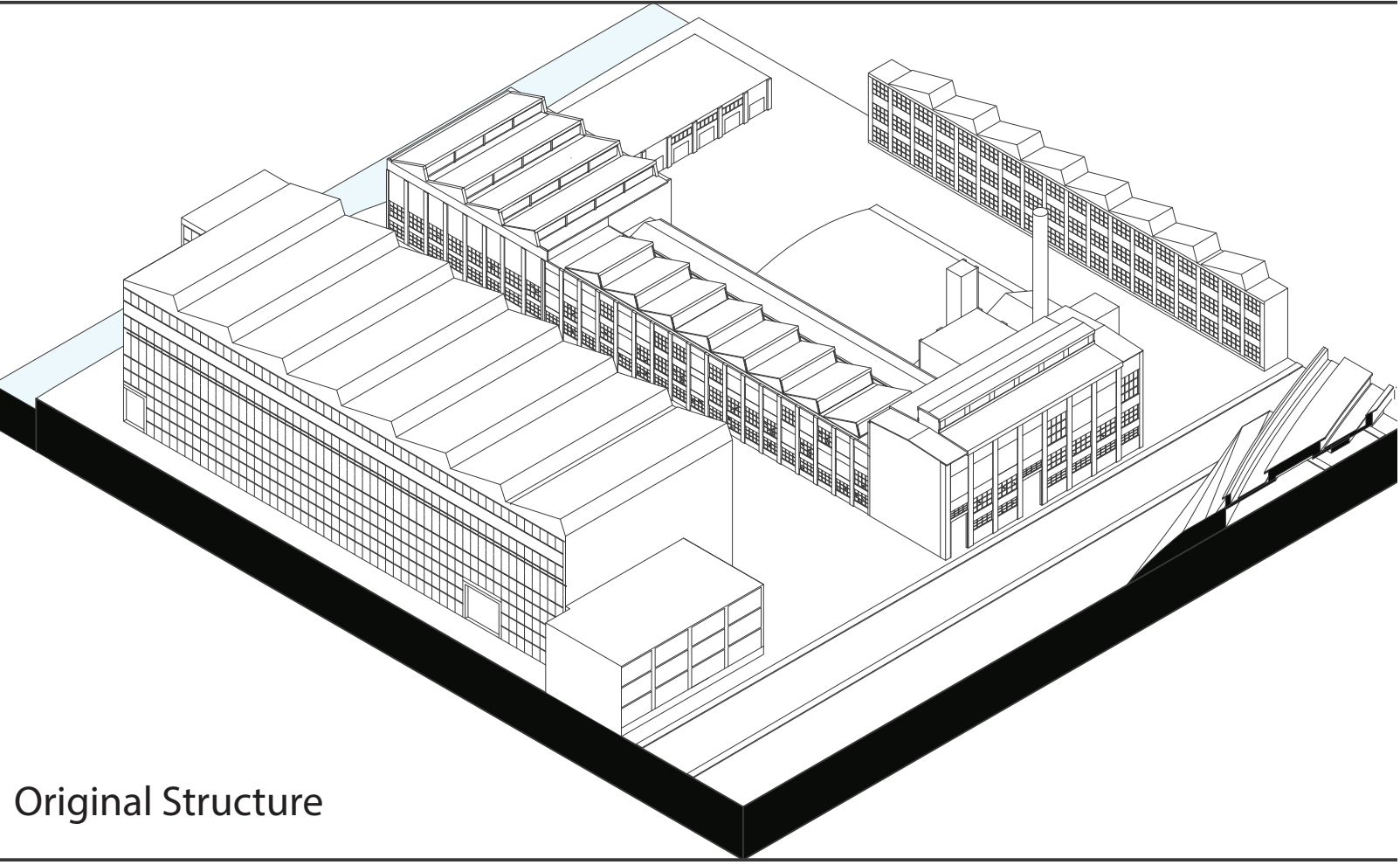


g Back

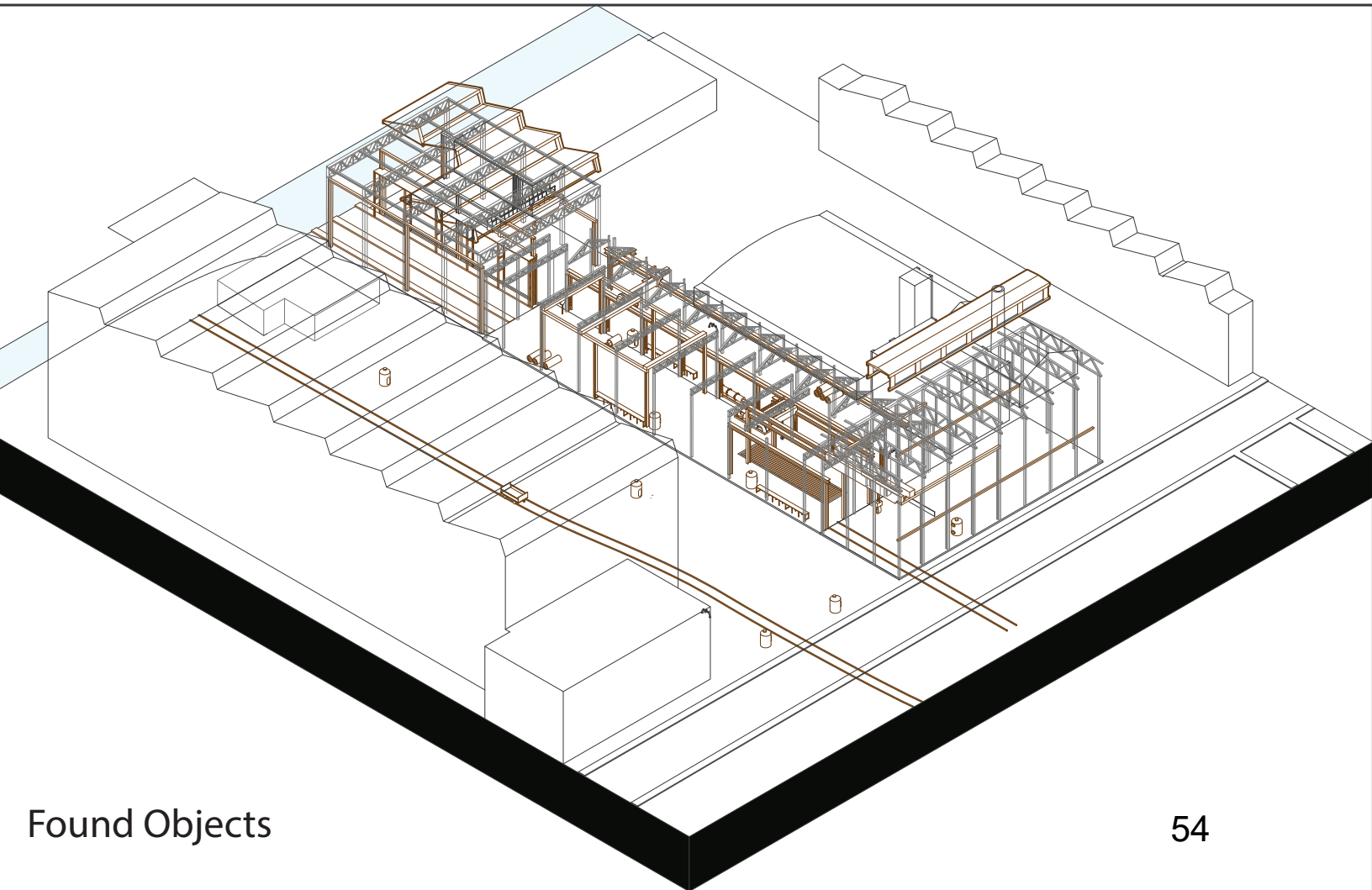
Productive Ruin







Original Structure

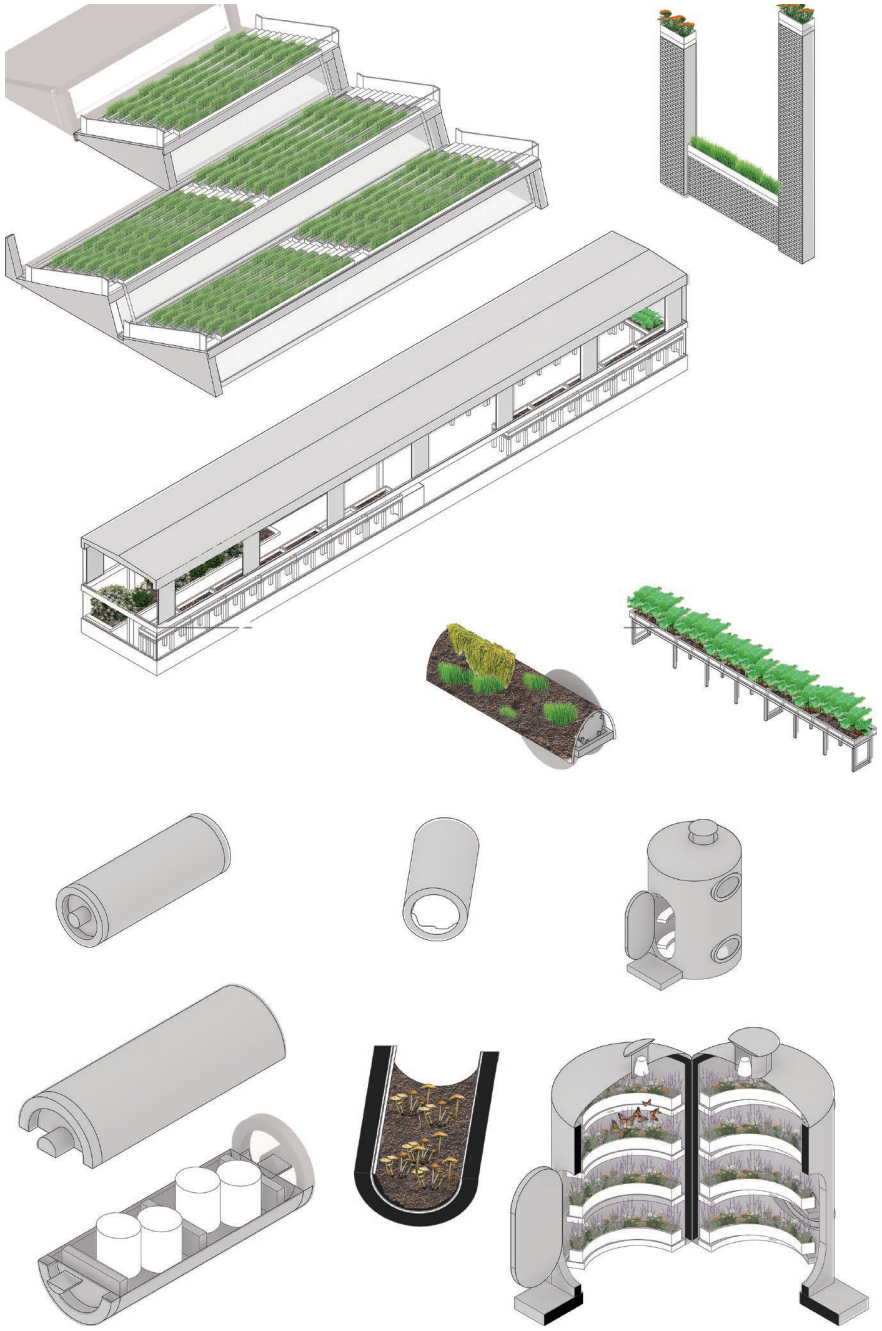


Found Objects

This project seeks to alter these abandoned industrial sites with the logic of Piranesi and open up the site in order to accommodate the naturally lit program that will inhabit it. The design attitude is one of further collapsing and fragmenting the structure as a way of stripping back the excess to reveal and utilize the framework of the site. In doing so revealing the objects to be activated.

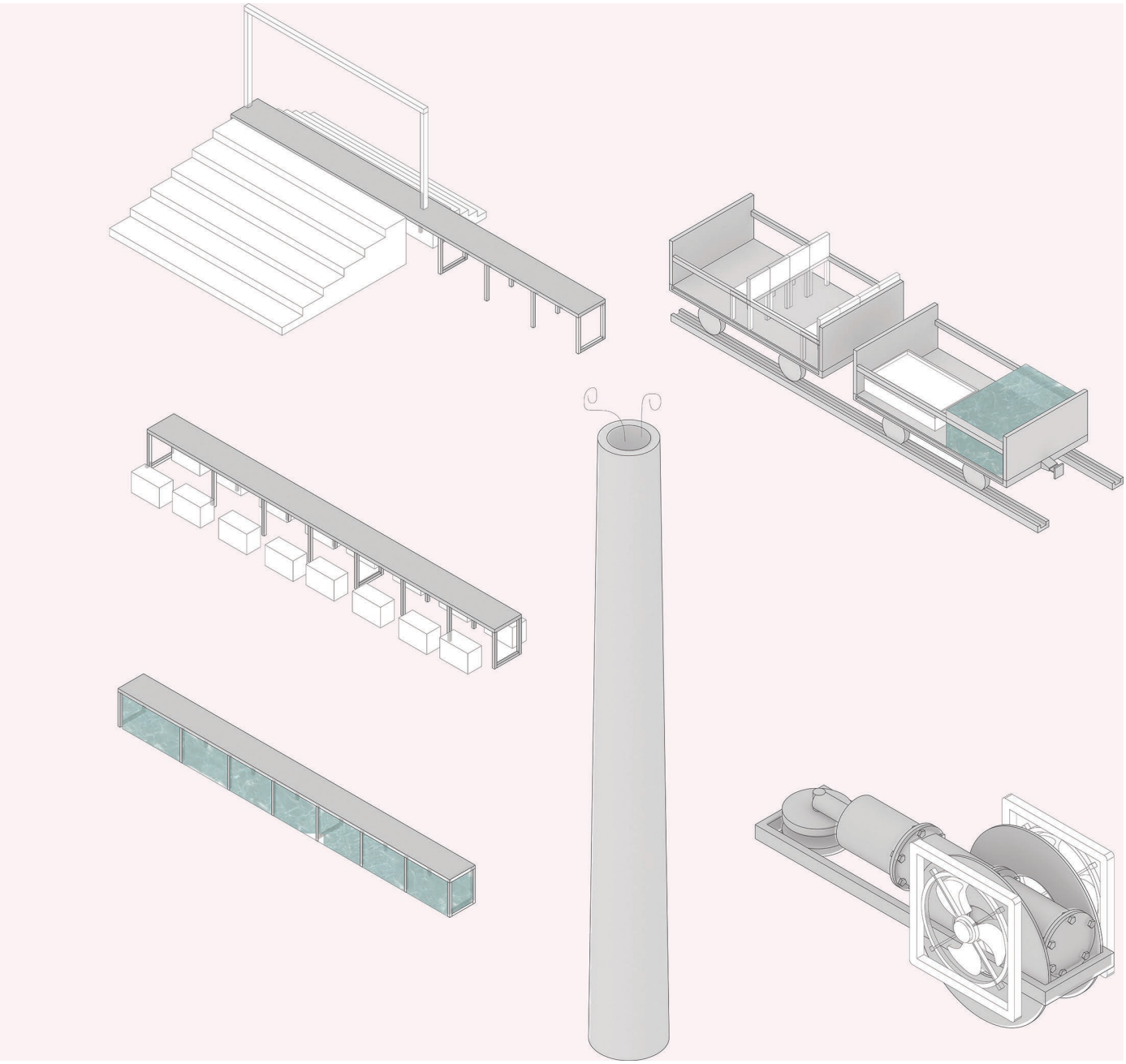
These two axons are the original structure and found objects (in brown). These objects represent the history of this specific site and the industrial building's unique typology.

Louis Kahn was of the belief objects having a dual purpose and objects that maximize their use. He, for example used the hollow columns in the first unitarian church for heat ventilation. In the same way, this project seeks to utilize these found objects as not just historical pieces to prop up but to activate them in a way that responds to the specific program laid out.



Activated for Growing

1. Sawtooth roof, work benches, residual equipment, and ruined brick ledges will be used for sites for elevated growing beds.
2. The Roof Monitor will enclose a greenhouse devoted to partial sun growing
3. The industrial storage tube will be used as an enclosed mushroom farm. Mushrooms are integral to the project as passive design tool to absorb the excess CO2 from all the growing.
4. Concrete tube will be used as both external seating and shaded growing beds
5. The steam boiler will then be lined with shallow racks for inhabitable recovery gardens

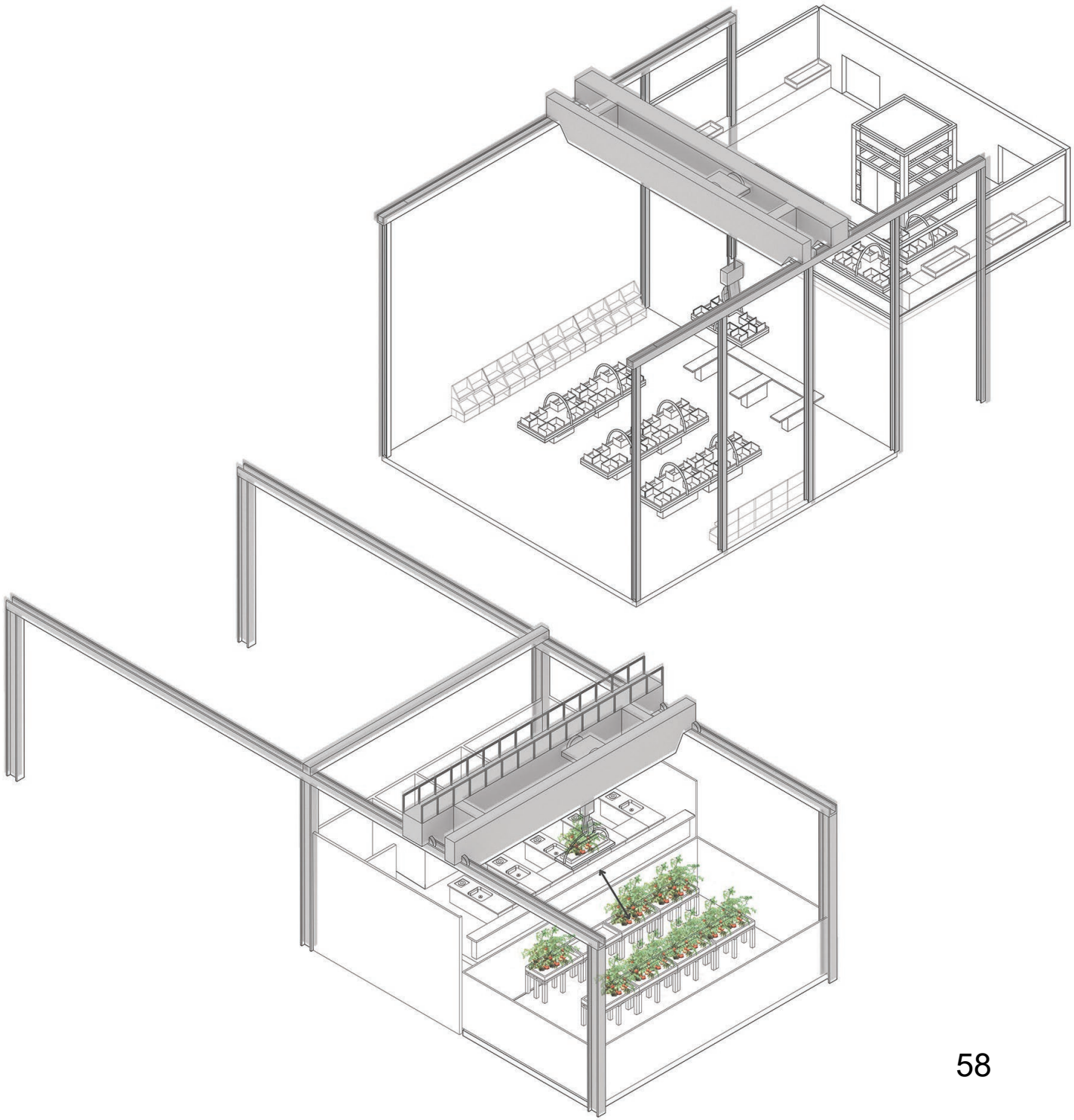


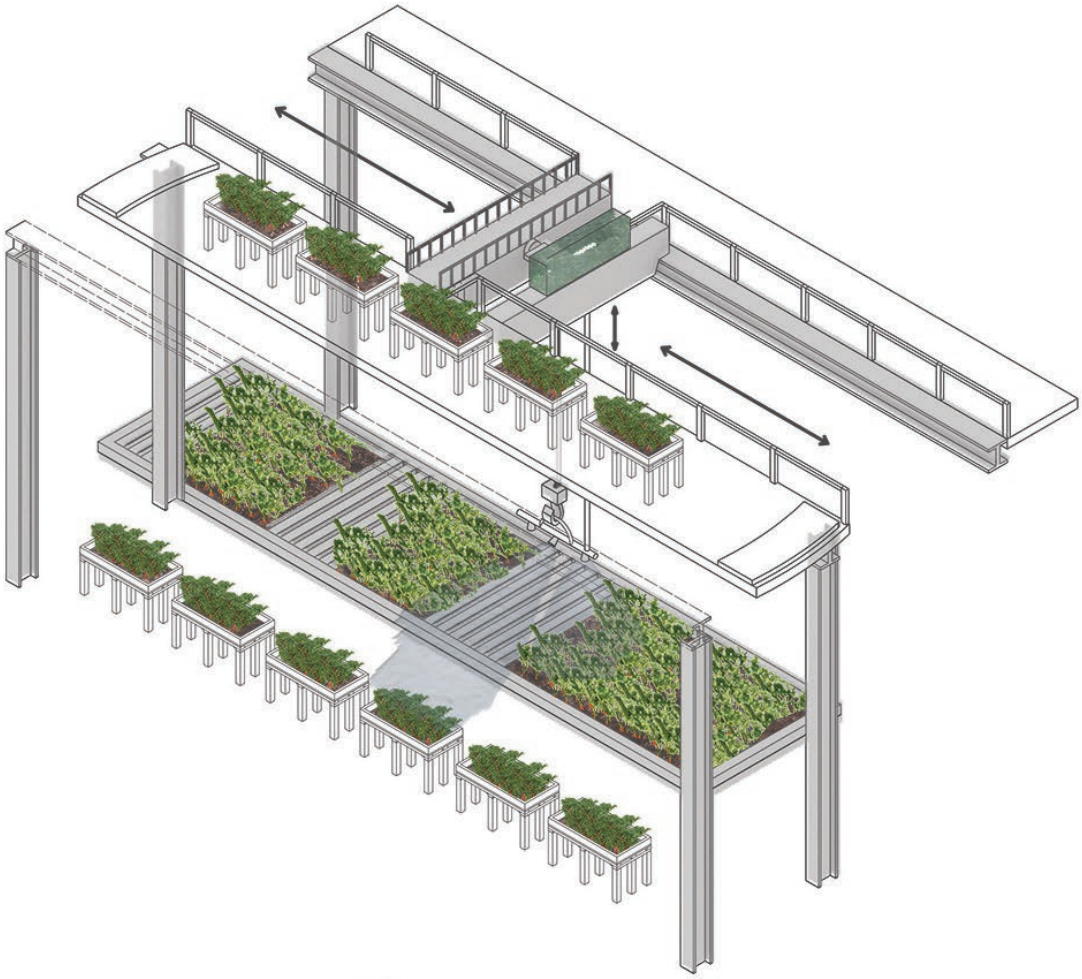
Activated for Infrastructure

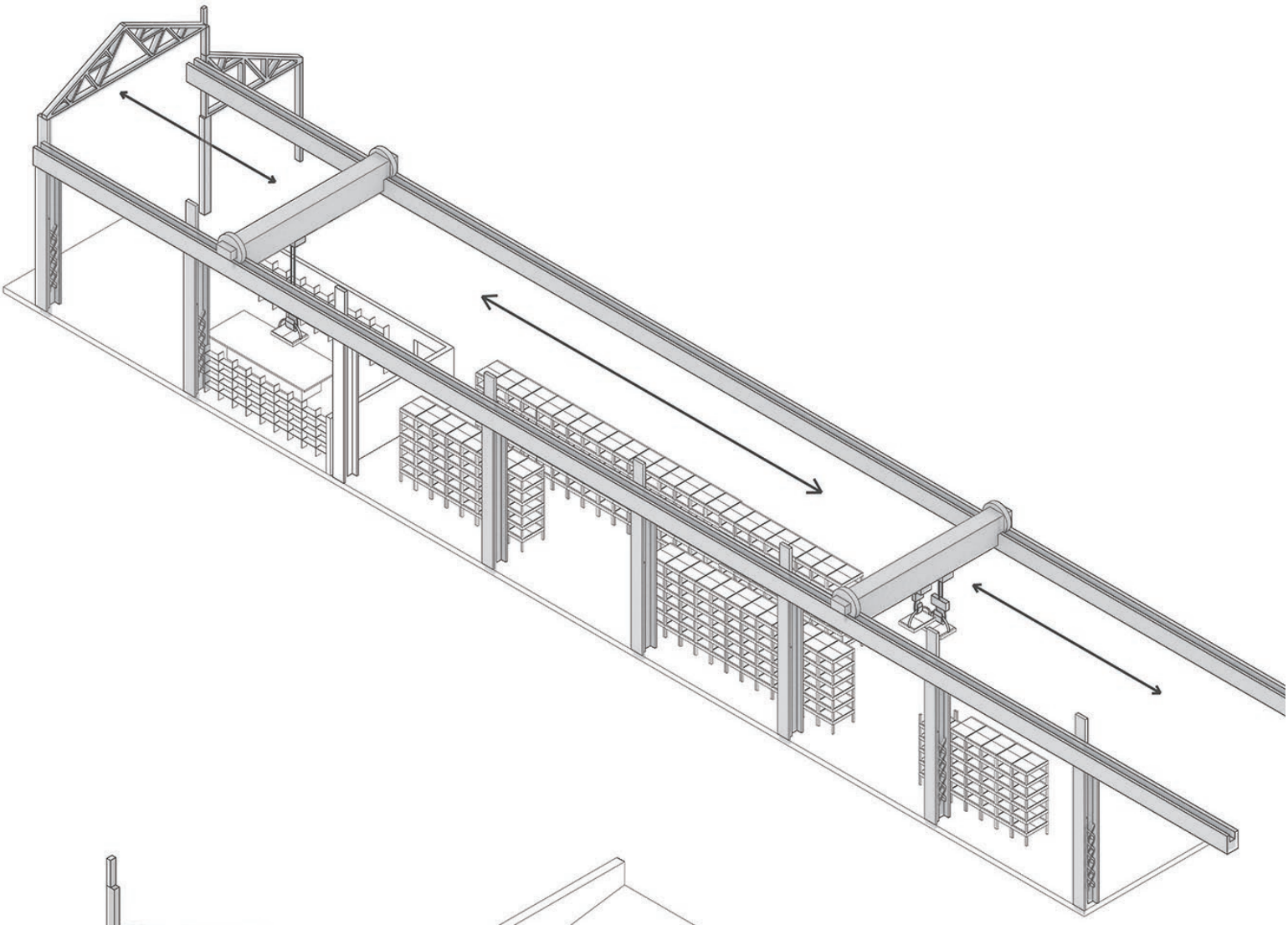
1. The work bench will be used as a threshold that takes users through the ruin in radical way with the use of stairs and can also be used for instruction gathering and water storage underneath
2. 3. The industrial rail will be reactivated to transport goods and people through the site.
3. The engine will be used for air circulation and power
4. The industrial chimney will then be connected to ventilation systems to allow hot air and excess CO2 to escape (to prevent overheating)

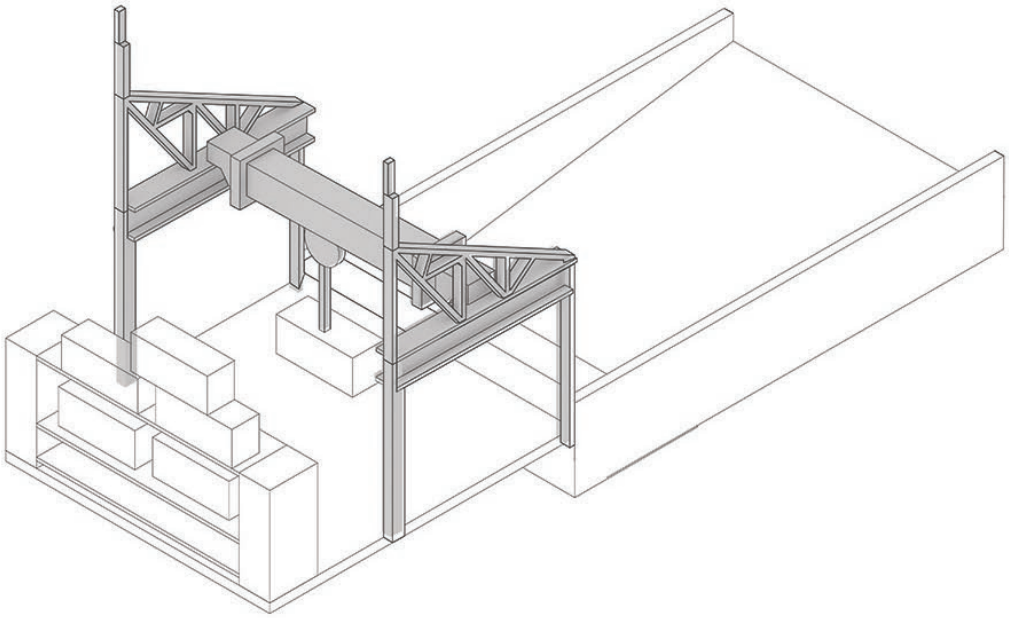
Overhead Cranes

Cranes are there to bridge the relationship between production and gathering or production and distribution. The overhead cranes provide the ability to have verticality within the site and have multiple levels. The cranes usually transport the goods. One, for example, carries packaged food from the packaging room (adjacent to one of the farms) to the food market. Another crane takes growing beds from their growing spots to test/community kitchens



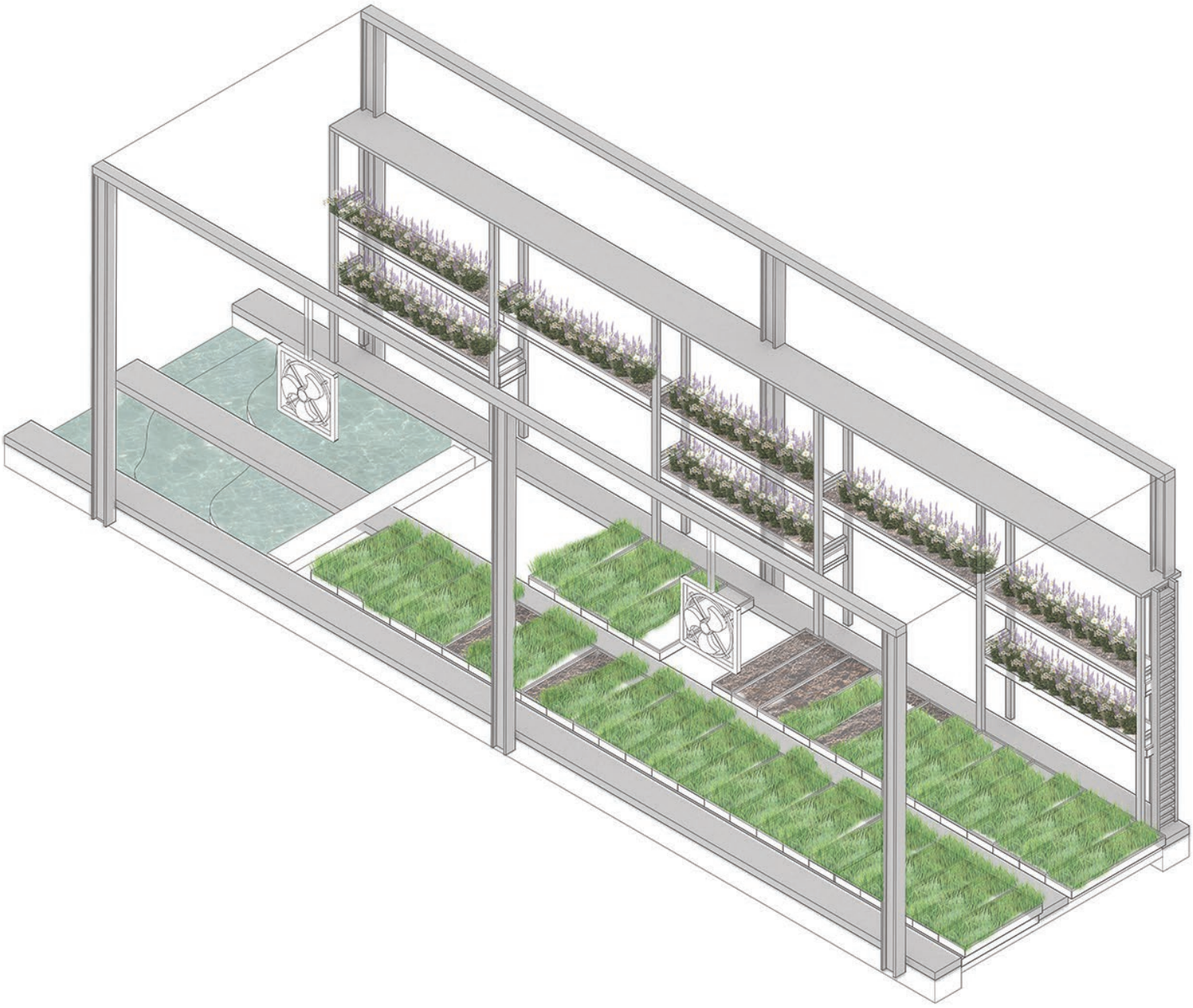






Shipbuilding tools

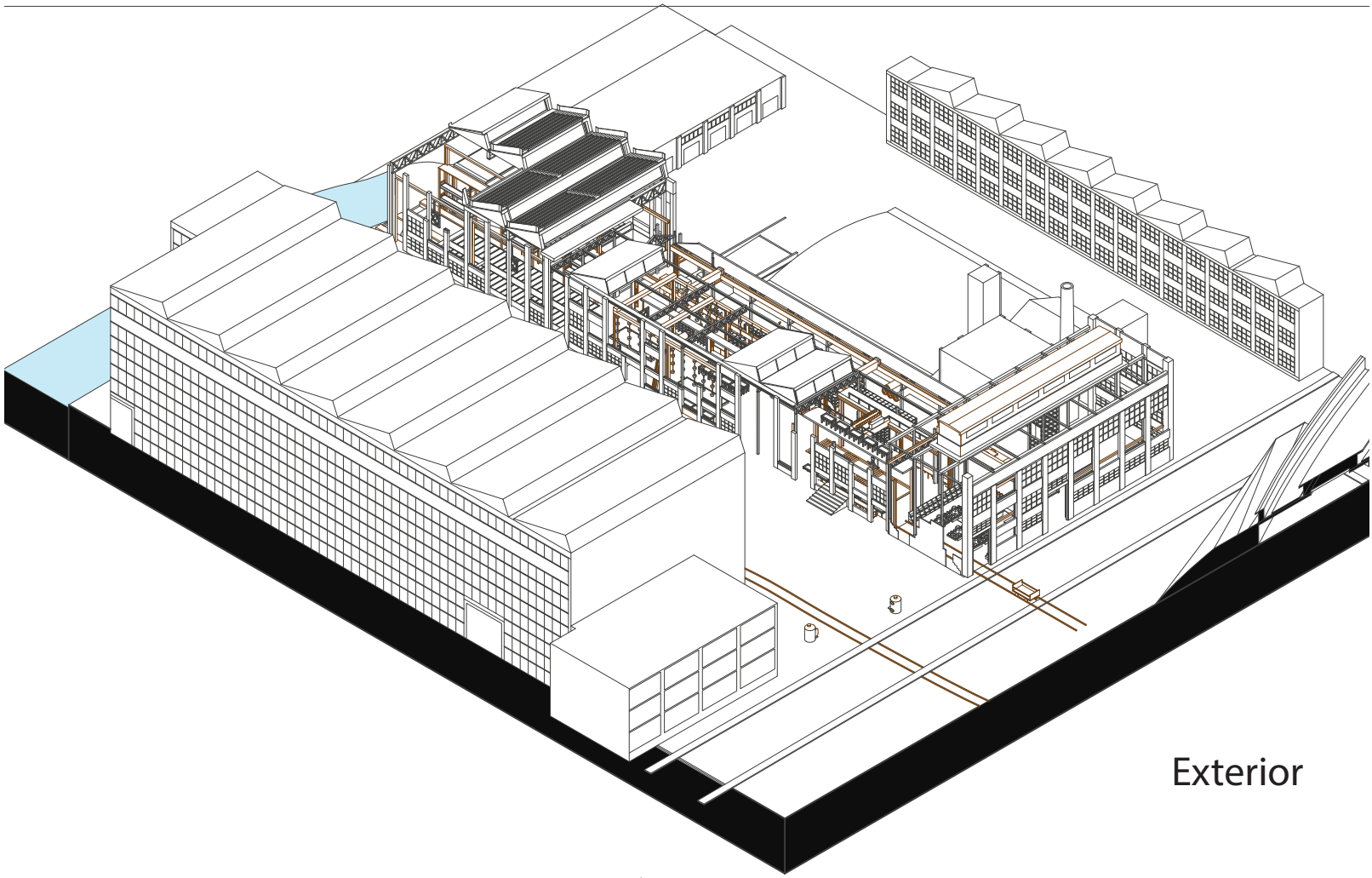
The carved out ground floor (was partially filled once that industry was no longer available) allows for inset of growing beds and the ability for water (from the river) to flood into the project. The racks provide space for growing beds and the structural ability to hold fans that would ventilate the space.



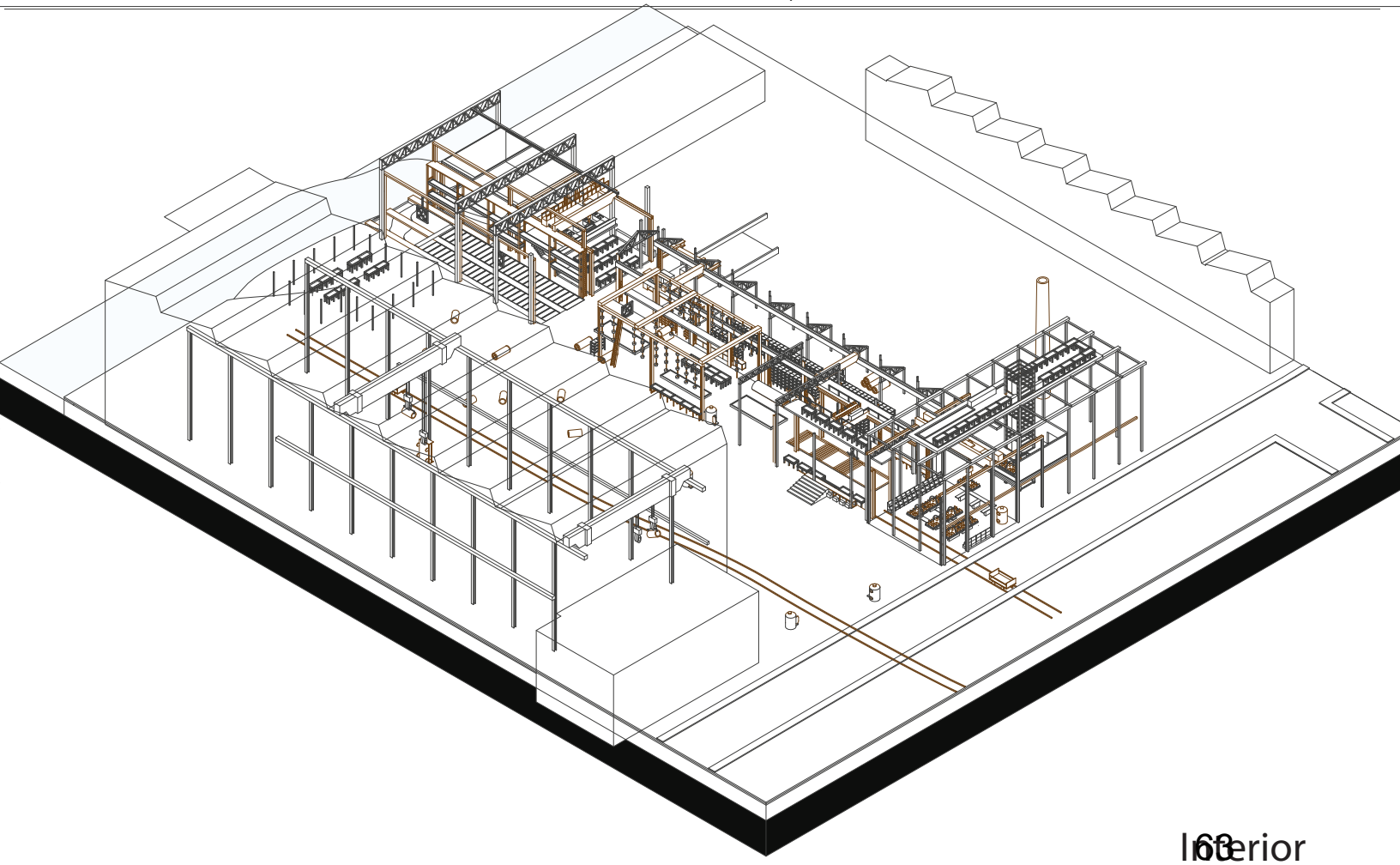
Activated Ruin

Once the objects have been activated, the rest of the structure(not in brown) is considered to be fair game in the process for ruination. The structure is deformed to accommodate for natural light, multiple points of access, and for the full function of these objects.

The steel manufacturer building (while not a constant activated object) will manufacture the design elements and object reactivation .

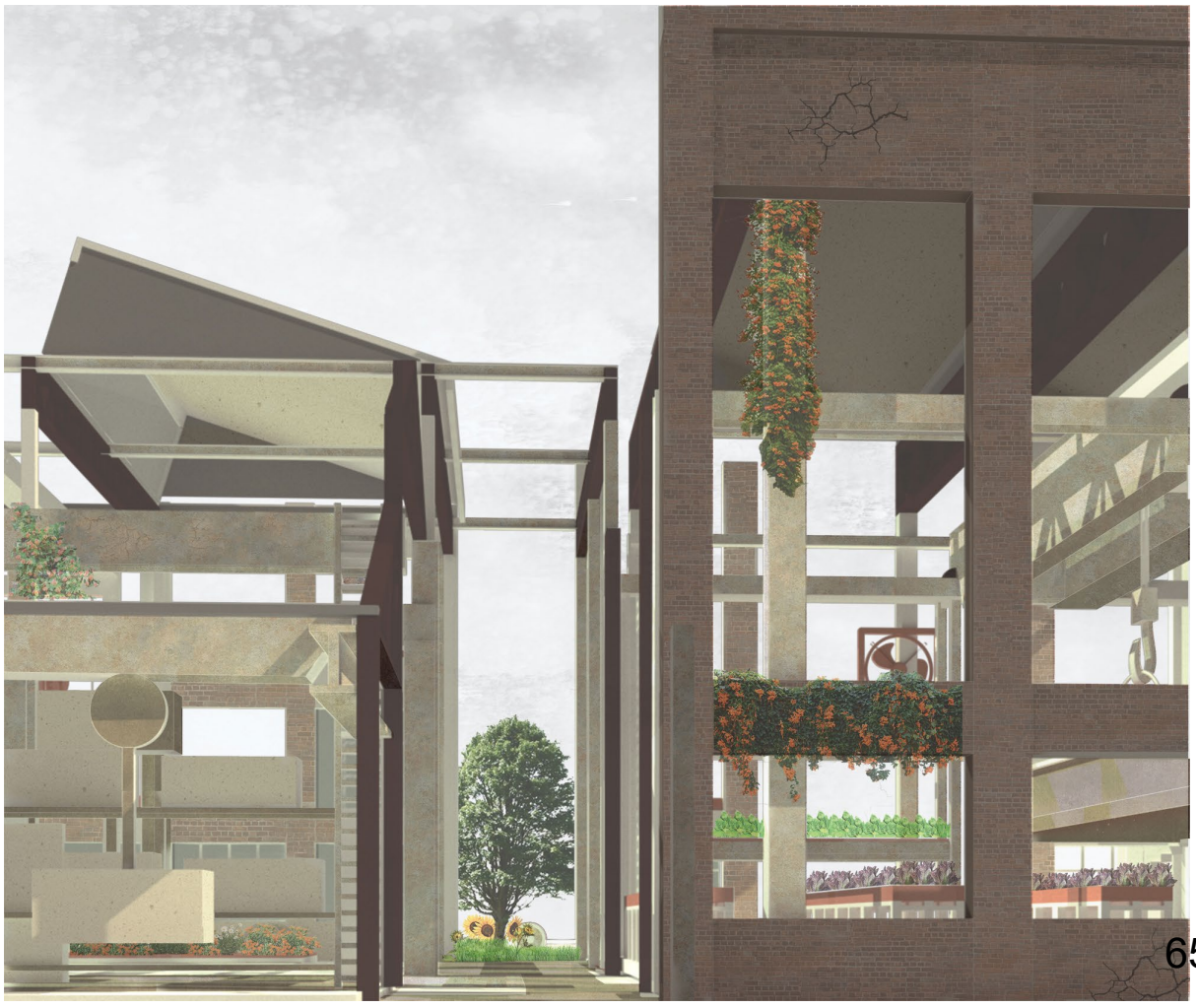


Exterior



Interior

These perspectives, like the historic ruin imagery before, represent a more controlled but still unstructured growth. The structure is “ruinized” and the building is still identifiable. These perspectives represent that scale and massiveness of the site and the site as a “productive” but not wholly functional ruin. The original spatial narrative has been modified but not radically altered. These perspectives represent the romantic ruin from the likes of Gandy, Adams, and Piranesi. It also shows the change in accessibility.



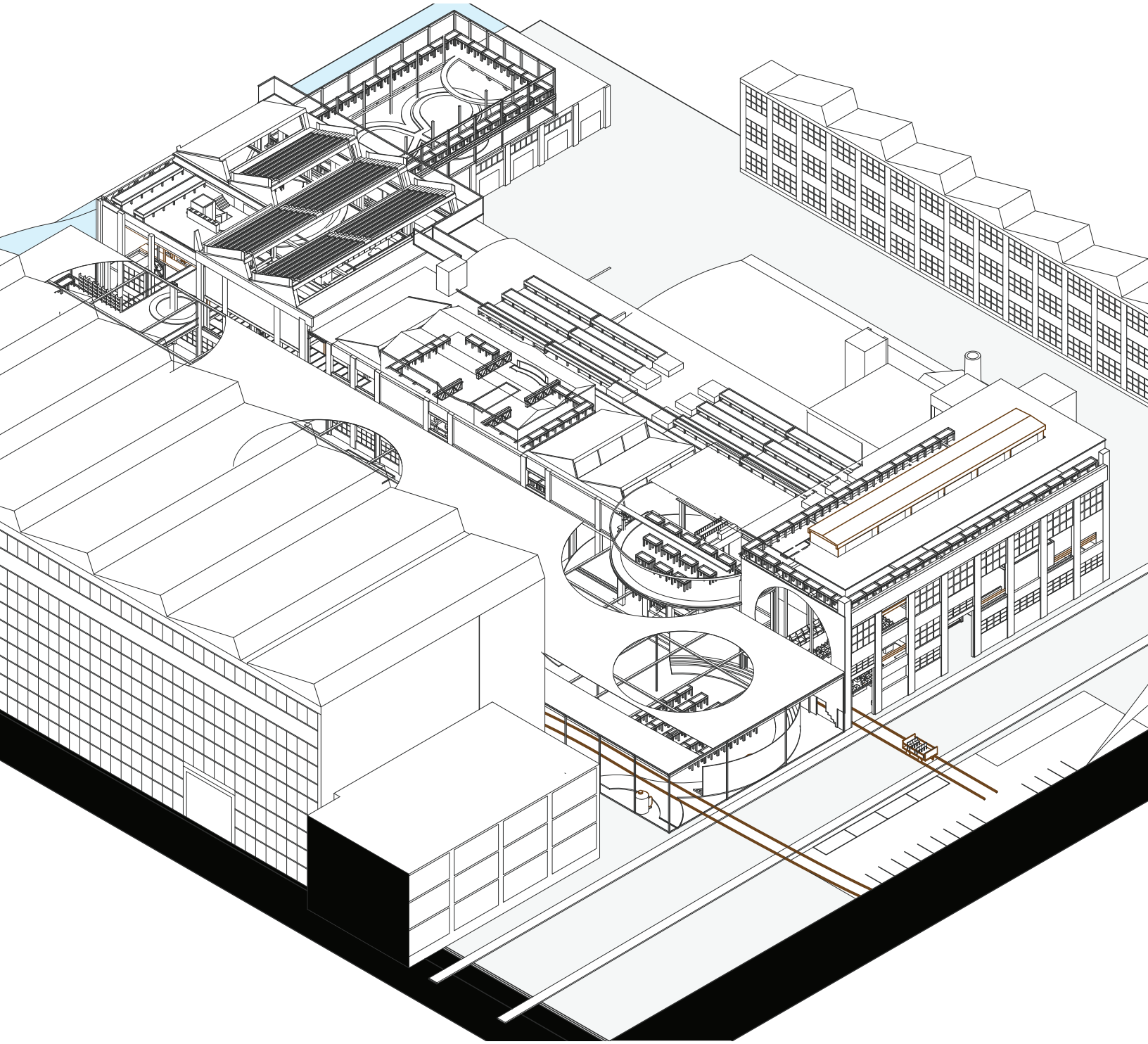
Agricultural Ruin

Once stripped back in the way that Fred Scott suggested, the project combines Carlo Scarpa's and William Morris' attitude towards integrating contemporary parts and enclosures while also creating a clear difference and in turn reverence for the industrial fragments that are left. Achieving a difficult whole through a dual modernity. The pieces that stay are intended to be both highlighted and used.

The goal was to actualize the project in a way that combined the tools from the crop diagrams and take into account: Program distribution, adjacency, enclosure, and infrastructure. This part becomes site specific. Prianesi used his ruination process to rethink site access and community involvement within the site. Access on this site was historically dealt with by perimeter fencing and particular openings. This design seeks to branch out in all directions and have the production spread out and be distributed.

This iteration, encloses the structure on all sides for practical reasons and is more concerned with circulation, program, enclosure, and narrative. Spaces that have issues with being shaded by adjacent buildings are covered with a punctured roof to accommodate both natural and artificial lighting. The upper part of stie is covered in greenhouse that take advantage of the natural light. The interior moments either rely on artificial light or are able to catch it through a ruined opening.

Most design elements build off of an existing structure allowing for less of a need for a hard structural intervention. The use of steel as a primary element references the site's history of shipbuilding but also activates its adjacent context which is a steel manufacturer.



Like most industrial sites, this one is located on a river and as a result utilizes its water as a way of water plants. This project employs wetlands as a way to purify its water source. The project is much more subdivided and allows for program to develop and exist.

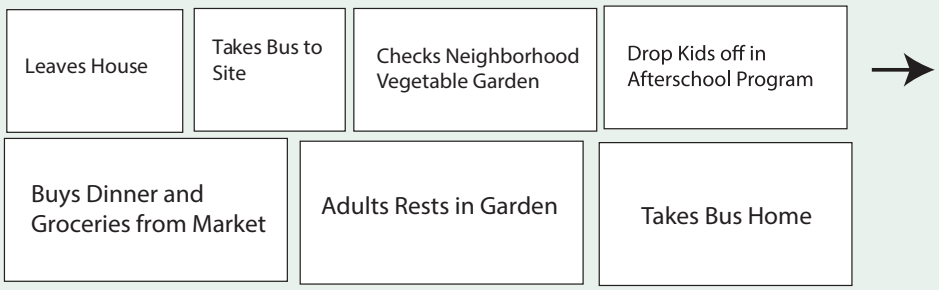
Introduction of a circular geometry in order to break the rectilinear and cornered geometry thus reframing the context and spatial narrative for the users. The space is divided into public and limited access private with their own circulation cores. The program is sequenced in a way that allows the users to watch and participate in the process of production to consumption. For example from the farm to kitchen to restaurant, on site.

Program List:

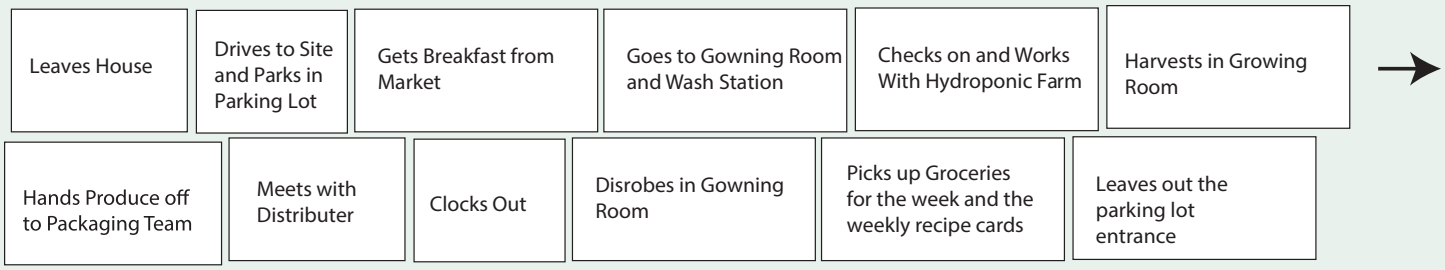
1. Wetlands
2. Classrooms
3. Play/ Recreational area
4. Food Market
5. Food Vendor area
6. Public Garden
7. Parking Lot
8. Parking Lot Entrance.
9. Gowning Room
10. Wash Station
11. Growing Room
12. Harvesting Room
13. Packaging Room
14. Loading Dock
15. Bus Stop
16. Indoor Pond
17. Work Ertrance
18. Kitchen Indoor and Foraging Gardens.
20. Student Ktichen w/
    - -Cold Storage
    - -Room Temperature Storage
    - - Wash Station
21. Locker Room
22. Restuarant
    - - With Kitchen
    - - With Bar
    - -Overlooking Water
23. Street Entrnace Public
24. Semi-Private Garden
25. Neighborhood Vegetable Gadens
26. River Entrance
27. Greenhouse (Private)
28. Control Room
29. Offices and Admin

Potential Sequences Through the Project

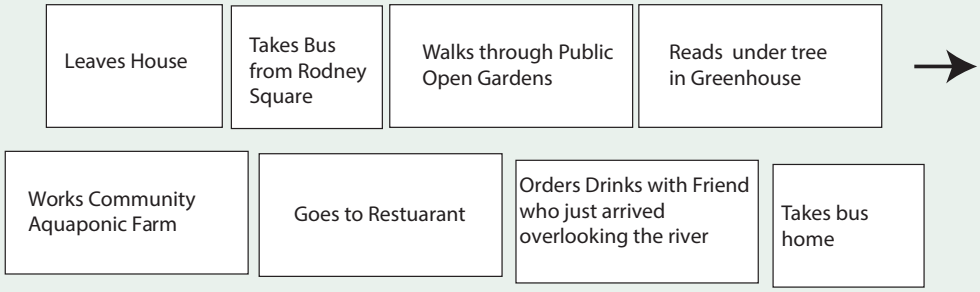
Family From the Neighborhood Across the River



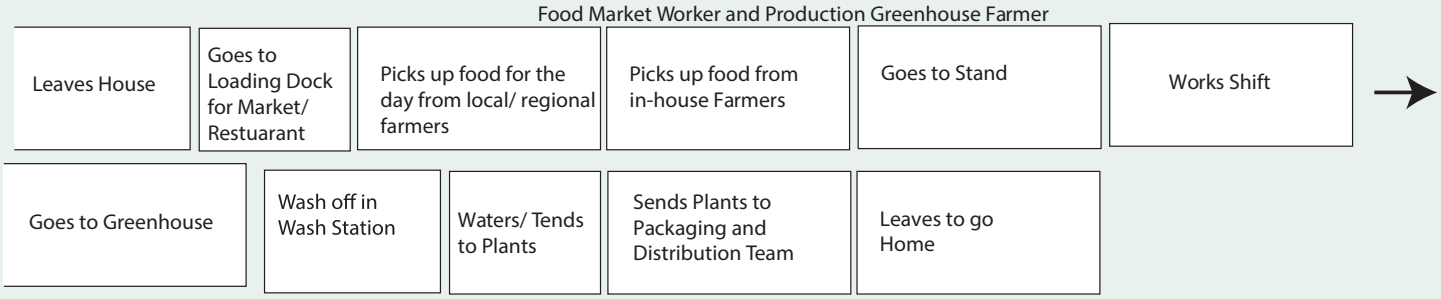
Farmer and Distributer (from suburbs)



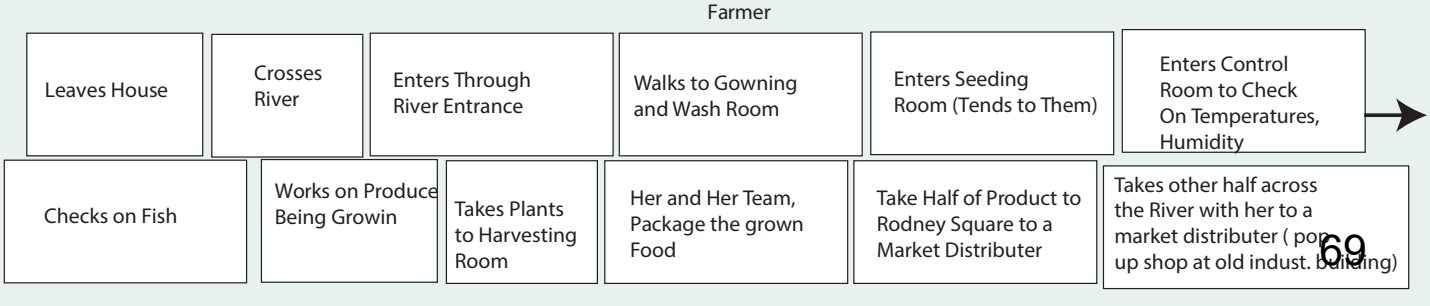
Person Seeking Solace, food, and comfort from Downtown of City



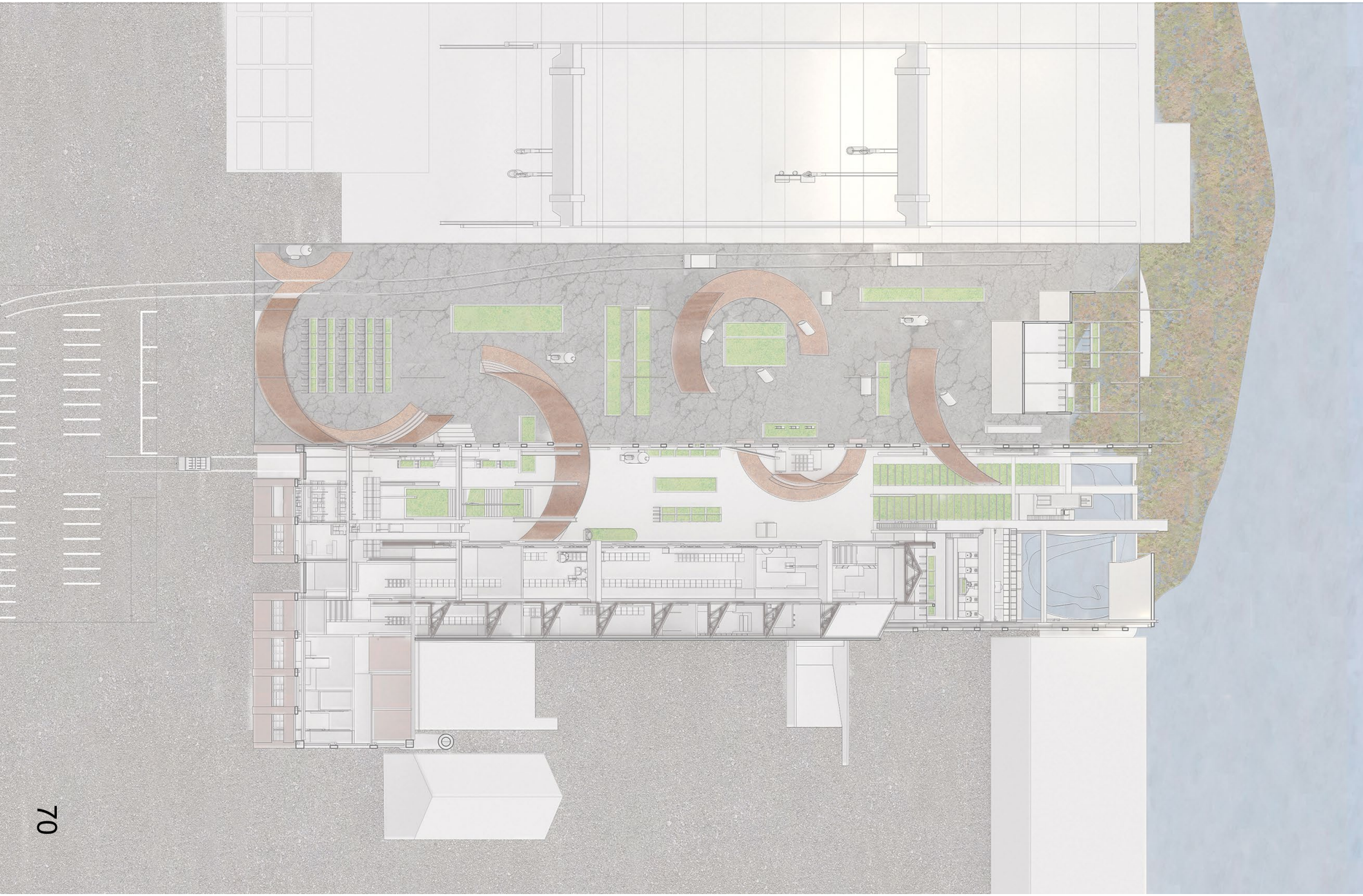
Food Market Worker and Production Greenhouse Farmer



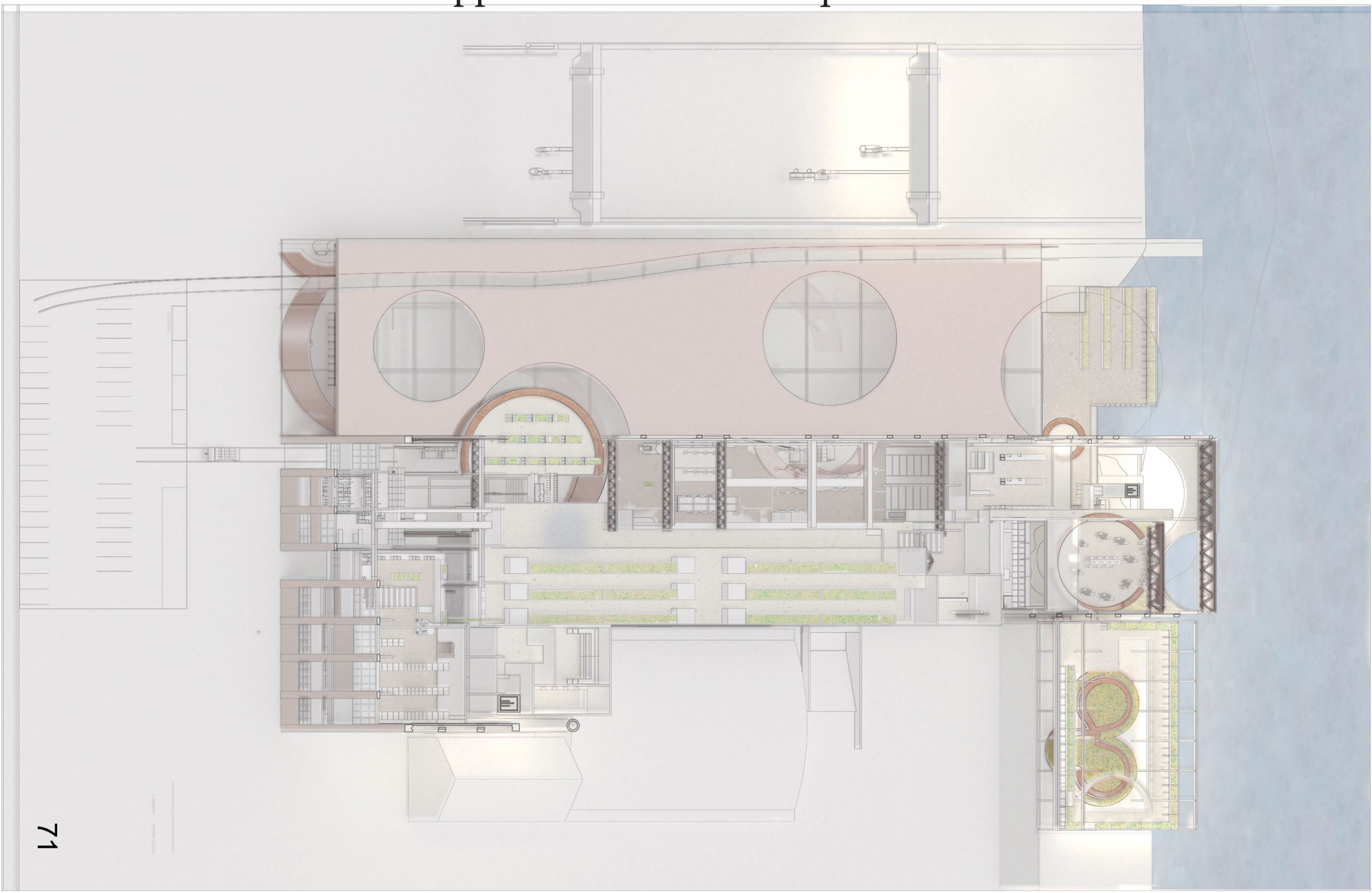
Farmer

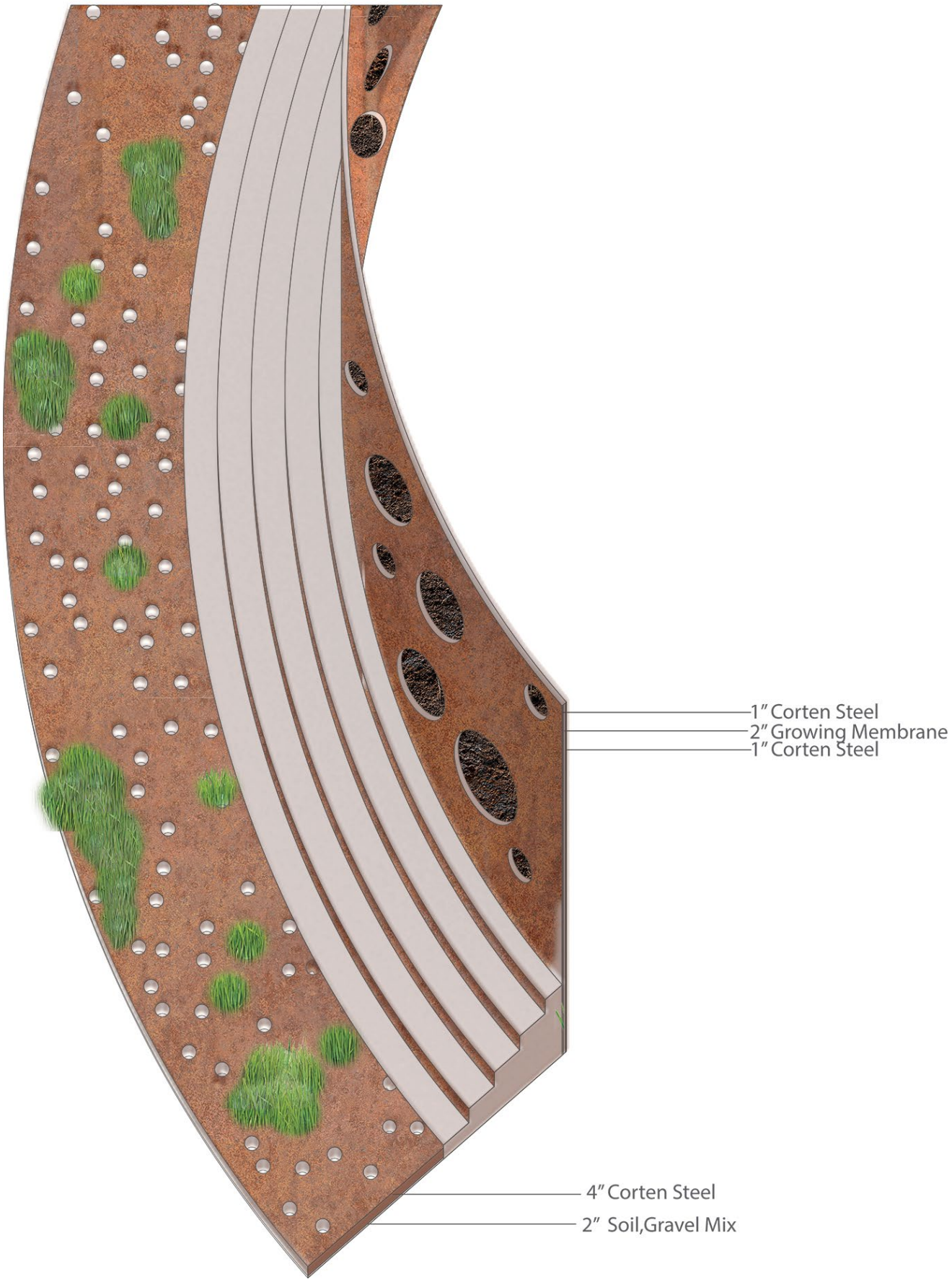


Ground Floor Plan Oblique



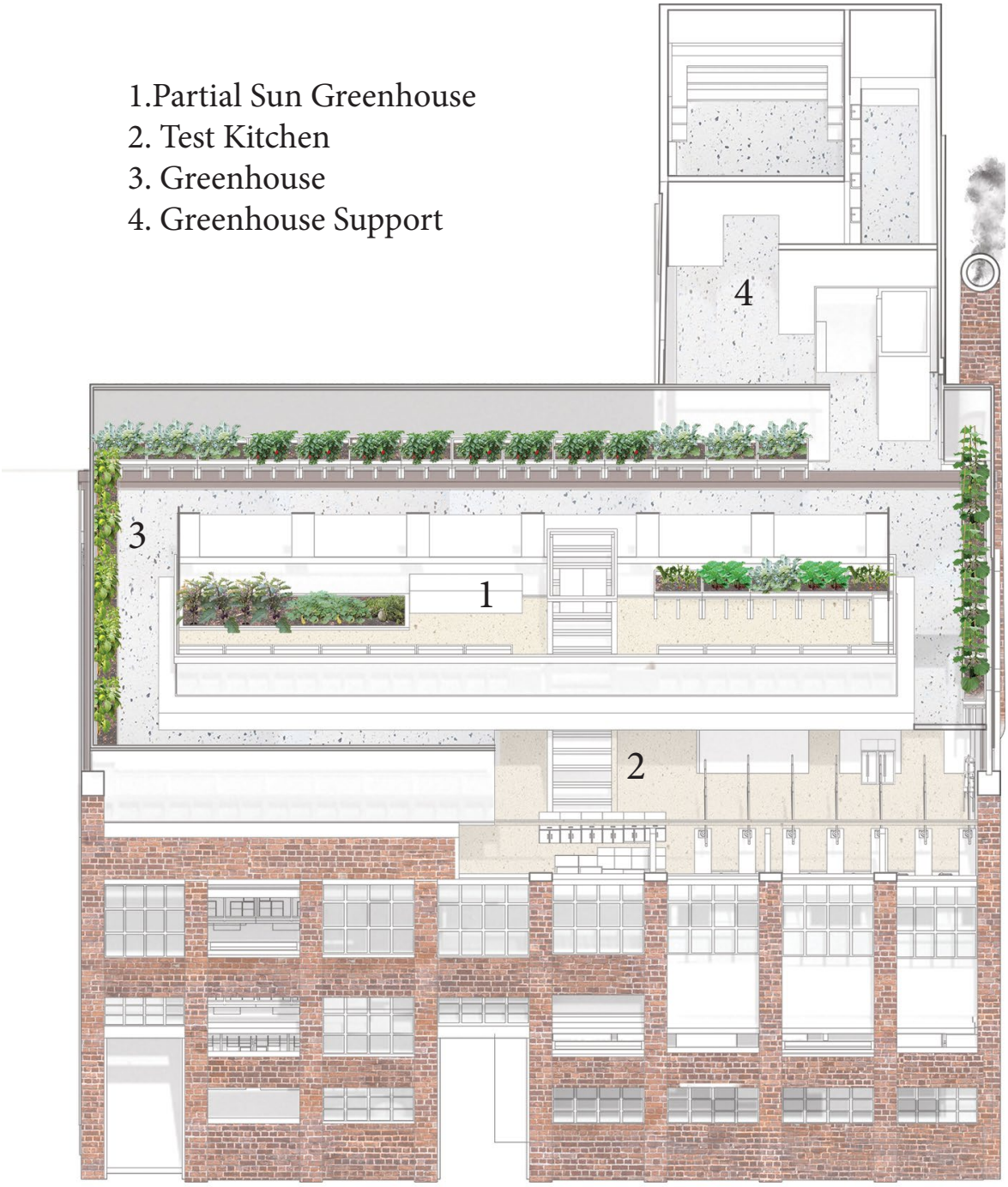
Upper Levels Plan Oblique





This detail looks at how the steel is punctured to further the idea of creating a sense of overgrowth in a controlled setting and allowing for diverse and evolving structural pieces. All the punctured steel has a growing membrane underneath and inbetween it.

1.Partial Sun Greenhouse
2. Test Kitchen
3. Greenhouse
4. Greenhouse Support



This detail looks at the designed programmatic relationship. The partial sun greenhouse on top can then be connected (vertically) by an elevator to the test kitchen. The larger greenhouse enclosing it is connected to its own harvesting and packaging room and has its own circulation core that connects it to the other floors.

They are there to represent the coming together of all parts in a human sale. The spatial narrative with the design interventions and activations is completely altered. The materiality allows one to be able to tell the difference between structure, ruin, and design objects. The goal is to create an accessible green space that is open to everyone that houses multiple program types focusing on the food/plant gathering, production, and distribution. The steel objects create a narrative focus on moments of productive growth or ruin.

The new sequence relies on the ability to move in and out of the ruin at multiple elevations. Users take into account the history of the structure and go towards a new program. The levels also allow for the ruin to be interacted with at multiple scales and allow for a layered experience within a single strucuture. Thus maximizing space and program potential. This particular view sees the users leaving the original exteiror of the ruin into the interior of a designed space. The vines and moss grows freely onto the original structure due to the costant moisture and lack of human interferrence with natural decay.

As illustrated by architects/artists like Piranesi and William Chambers, a ruin can be seen as a site for the potential of overgrowth and reuse in its ability to be a host for a visual feast and vegetated growth. Where these plants and species are able to expand and grow, uninterrupted by the man made confines. The seemingly unproductive plants of ivy and moss are able to freely and fully embrace their intended purpose. These would consume the architectural ruin and these original sites of human importance became breeding grounds. What if these modern day abandoned sites became hosts of not arbitrary and natural overgrowth but productive overgrowth that responds to urban context? Pushing that further what if these ruins started to create a network of overgrowth that reaches a larger audience and responds to environmental and geographical crises?